

Clinton River Watershed Remedial and Preventive Action Plan

1995 Update



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Surface Water Quality Division

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Effective October 1, 1995, environmental protection programs formerly part of the Michigan Department of Natural Resources have been moved to a new Department of Environmental Quality (MDEQ). Programs in Wildlife and Fisheries divisions remain in MDNR; all other divisions involved in the Clinton River RAP now reside in MDEQ. This document reflects those changes.

Cover photos taken by Peggy Johnson and Roger Darden. Cover design by Jean Hude.

Glossary of Acronyms and Abbreviations

| | | | |
|-------|--|--------|---|
| AOC | Area of Concern | NPDES | National Pollutant Discharge Elimination System |
| AQD | Air Quality Division | NPS | Nonpoint Sources |
| BMPs | Best Management Practices | NRCS | Natural Resources Conservation Service (formerly the Soil Conservation Service) |
| BTEX | Benzene, Toluene, Ethylbenzene, Xylenes | PAC | Public Advisory Council |
| CEA | County Enforcing Agency | PCBs | Polychlorinated Biphenyls |
| CES | Cooperative Extension Service | ppm | parts per million |
| CRWC | Clinton River Watershed Council | ppb | parts per billion |
| CSO | Combined Sewer Overflow | PRP | Potentially Responsible Party |
| DDD | Dichlorodiphenyl Dichloroethane | RAP | Remedial Action Plan |
| DDE | Dichlorodiphenyl Dichloroethylene | RAPIDS | Regional Air Pollutant Inventory Development System |
| DDT | Dichlorodiphenyl Trichloroethane | SEMCOG | Southeast Michigan Council of Governments |
| D.O. | Dissolved Oxygen | SMDA | Southeast Michigan Disposal Authority |
| DPW | Department of Public Works | SOCRRA | Southeast Oakland County Resource Recovery Authority |
| g | gram | SOCSDS | Southeast Oakland County Sewage Disposal System |
| GLNPO | Great Lakes National Program Office | SPAC | Statewide Public Advisory Council |
| HCMA | Huron-Clinton Metropolitan Authority | SRF | State Revolving Fund |
| HHW | Household Hazardous Waste | SWCD | Soil and Water Conservation District |
| IJC | International Joint Commission | SWQD | Surface Water Quality Division |
| IPP | Industrial Pretreatment Program | TKN | Total Kjeldahl Nitrogen |
| LEA | Local Enforcing Agency | TMA | ThermoAnalytical, Inc. |
| LUST | Leaking Underground Storage Tank | ug/L | micrograms per liter |
| MDA | Michigan Department of Agriculture | USACOE | U.S. Army Corps of Engineers |
| MDEQ | Michigan Department of Environmental Quality | USDA | U.S. Department of Agriculture |
| MDNR | Michigan Department of Natural Resources | USEPA | U.S. Environmental Protection Agency |
| MDPH | Michigan Department of Public Health | USGS | U.S. Geological Survey |
| MGD | Million Gallons per Day | WMD | Waste Management Division |
| mg/kg | milligrams per kilogram | WWTP | Wastewater Treatment Plant |
| mL | milliliter | | |
| MSU | Michigan State University | | |

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1995 Update

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Chapter 1. Introduction

Remedial Action Plan Overview

The Great Lakes Water Quality Agreement between the United States and Canada decreed that Remedial Action Plans be developed for 43 Great Lakes basin Areas of Concern (AOCs). The Clinton River was designated an Area of Concern in 1985 because of contamination by conventional pollutants, including high fecal coliform bacteria and nutrients; high total dissolved solids; sediment contaminants, including heavy metals, PCBs, and oil and grease; and because of impacted biota. The original AOC boundaries were defined as the main branch of the Clinton River downstream of the Red Run Drain, and the spillway.

In Michigan, the Department of Environmental Quality has coordination responsibility for Remedial Action Plans (RAPs). However, RAPs are developed with input from a diverse array of stakeholder groups under the directorship of Public Advisory Councils (PACs). PACs are local consortiums of individuals representing local government, industry, education, the environment, health, recreation, and other entities with an interest in surface waters and their many uses. Many federal, state and local agencies also participate in the RAP process.

The initial Clinton River RAP document was completed in 1988. The authors concluded that most of the identified problems in the Clinton River were localized, and not impacting the Great Lakes. The 1988 RAP recommended 23 actions to address environmental degradation. These actions and their current status are outlined in Table 1.1.

For five years following the publication of the 1988 document, progress on the RAP was intermittent. In 1993 the Public Advisory Council for the Clinton River was revitalized. During 1994 a RAP Team and three technical work groups (Point Sources/Nonpoint Sources, Habitat, Contaminated Sediments) convened to

direct effort towards RAP activities and to develop the RAP Update. The AOC boundaries have been redefined, and now encompasses the entire watershed.

A detailed account of natural features, land use, water use, environmental problems, and regulations is found in the 1988 RAP. This 1995 Update serves to briefly amend that information, but is chiefly an action plan to address water quality problems in the watershed.

The 1995 Update reflects the dovetailing of three sets of guidelines for producing RAPs: guidelines for Remedial Action Plan content set forth in Annex 2 of the 1987 Amendment to the Great Lakes Water Quality Agreement; the Michigan RAP process of producing biennial updates that focus on locally determined priorities; and the Clinton River Public Advisory Council decision to produce a short, user-friendly document in the interest of widespread readership and use by citizens and implementors.

This Update is designed as a working document and will be biennially updated and corrected.

Table 1.1. The 1988 Clinton River Remedial Action Plan 23 recommended activities, and their current implementation status. Where the current status of a recommendation is either "modified" or "ongoing", the recommendation has been incorporated into the 1995 action plan, in one form or another.

| Impaired Use | Problem | Recommendation | Status |
|---|---|--|------------------------------------|
| warmwater fish | low D.O.; degraded community | survey to determine extent of problem | ongoing; future study planned |
| | low D.O.; degraded community; toxicity | do caged fish study | not best way to proceed |
| benthic macro-invertebrate community degradation | sediment toxicants | do sediment bioassays | modified, ongoing |
| | sediment toxicants; poor habitats | support USACOE dredging | completed |
| | locally degraded community | survey to document extent of problem | ongoing |
| local fish and benthic macro-invertebrate community degradation | locally degraded community | survey to determine sources of oxygen consuming substances for waste load allocation | no action; not best way to proceed |
| | low D.O.; poor physical habitat; poor flow regime | waste load allocation for Clinton River point source dischargers | no longer applicable |
| | | complete upgrading of Mt. Clemens and Armada WWTPs | completed |
| | | reduce frequency or eliminate overflow to Red Run from SOCSDS/PCF | ongoing |
| | low D.O.; poor physical habitat; toxicants | do smoke and dye studies for illegal hook-ups | some ongoing; more required |
| | low D.O.; poor physical habitat; toxicants | enforce best management practices for nonpoint sources | ongoing |
| | low D.O.; low flow | determine effect of weir modification | completed* |
| | diffuse toxicant loadings | increase air quality monitoring | ongoing |
| | local toxicant loadings | continue and expand 307 and superfund studies | ongoing |

| | | | |
|---|---|---|-------------------|
| Potential local and Great Lakes PCB contamination of fish | PCB in sediments | verify presence or absence in previously reported areas | completed |
| | PCB and other organics in surface water | monitor water for organic contaminants by river section | completed |
| | PCB in aquatic environment | expand fish contaminant monitoring | completed |
| Sediments block river flow | low flow; low D.O. | define source of sediments | ongoing |
| | low flow; low D.O. | remove sediments at Shadyside Park | completed* |
| Clinton River ecosystem | disjointed watershed approach | establish a watershed funded clearinghouse for studies, information, and issues | modified, ongoing |
| Potential fish consumption advisories | PCB in fish | Do caged fish studies to determine local PCB sources | completed |
| PCB in aquatic life derived from sediments or water | PCB in sediments | sample sediments for PCB concentrations | completed |
| | PCB in water | sample water for PCB concentrations | completed |

* Shadyside Park sediments were removed in 1991. Subsequent sedimentation now requires that dredging once again take place at this location. The USACOE plans to remove these sediments in 1996 prior to construction activities associated with weir modifications. Until adequate upstream erosion control measures are implemented, regular dredging will be required.

Beneficial Use Impairments

The Clinton River drains 760 square miles in southeast Michigan, and is located mostly in Oakland and Macomb counties; small portions extend into Lapeer and St. Clair counties (Figure 1.1). Land use in the watershed is mostly industrial, urban and suburban. Agriculture is still common along the North Branch of the Clinton River, although urban expansion is rapidly preempting farmland. The human population of the watershed is estimated at 1.5 million, and growing rapidly.

The 1988 RAP was substantially written prior to the 1987 amendments to the Great Lakes Water Quality Agreement, which established 14 potential beneficial use impairments. As such, environmental concerns in the Clinton River Watershed were not evaluated within the context of this framework until the deliberations of the technical work groups in 1994. Table 1.2 outlines the eight beneficial uses that are currently considered impaired.

Three of the beneficial uses considered to be impaired in the Clinton River have impacts restricted to the watershed. Three others, "restrictions on wildlife consumption" (in this case referring to carp), "eutrophication" and "beach closings" do have impacts on the Great Lakes, but these are confined to the western nearshore areas of Lake St. Clair. Given that the Clinton River has been home to a rich and unique mussel fauna, we consider the degradation of these populations to be a loss to the Great Lakes Basin. The significant loss and degradation of wildlife habitat for nesting, spawning, etc. also is considered to have impacts on the Great Lakes.

Although historical industrial and municipal discharges were the primary causes of environmental degradation in the Clinton River, and thus of its designation as an AOC, ongoing contamination problems are largely of nonpoint source origin. There are no major industrial discharges to the river or its tributaries of process water (only noncontact cooling water

and stormwater), and most (though not all) municipal facilities have adequate industrial pretreatment programs and have implemented combined sewer control plans. As such, stormwater runoff as a category (including the two municipal systems still experiencing combined sewer overflows, failing septic systems, and illegal connections to storm drains), is the single greatest source of water quality degradation. The prevalence of impervious surfaces exacerbates runoff problems. Erosion and sedimentation contribute significantly to use impairments, thus sediments are considered a primary contaminant in the Clinton River.

Very rapid urban expansion and the subsequent loss of wildlife habitat is the second significant environmental problem related to water quality in the Clinton River watershed. Oakland County leads the state in new construction, and Macomb County is experiencing rapid urbanization as well. Wetlands and other wildlife habitat have all but been eliminated from the downstream portion of the basin, and natural drainage has been drastically altered throughout the watershed.

Historical point source discharges and some nonpoint sources are responsible for sediment contamination in the mainstem Clinton River. Metals, nutrients, petroleum hydrocarbons, PCBs, DDT and other organic compounds reside in the sediments at levels of concern from Pontiac to the mouths of both the river and the spillway, as well as in the Red Run Drain/Plum Brook subwatershed.

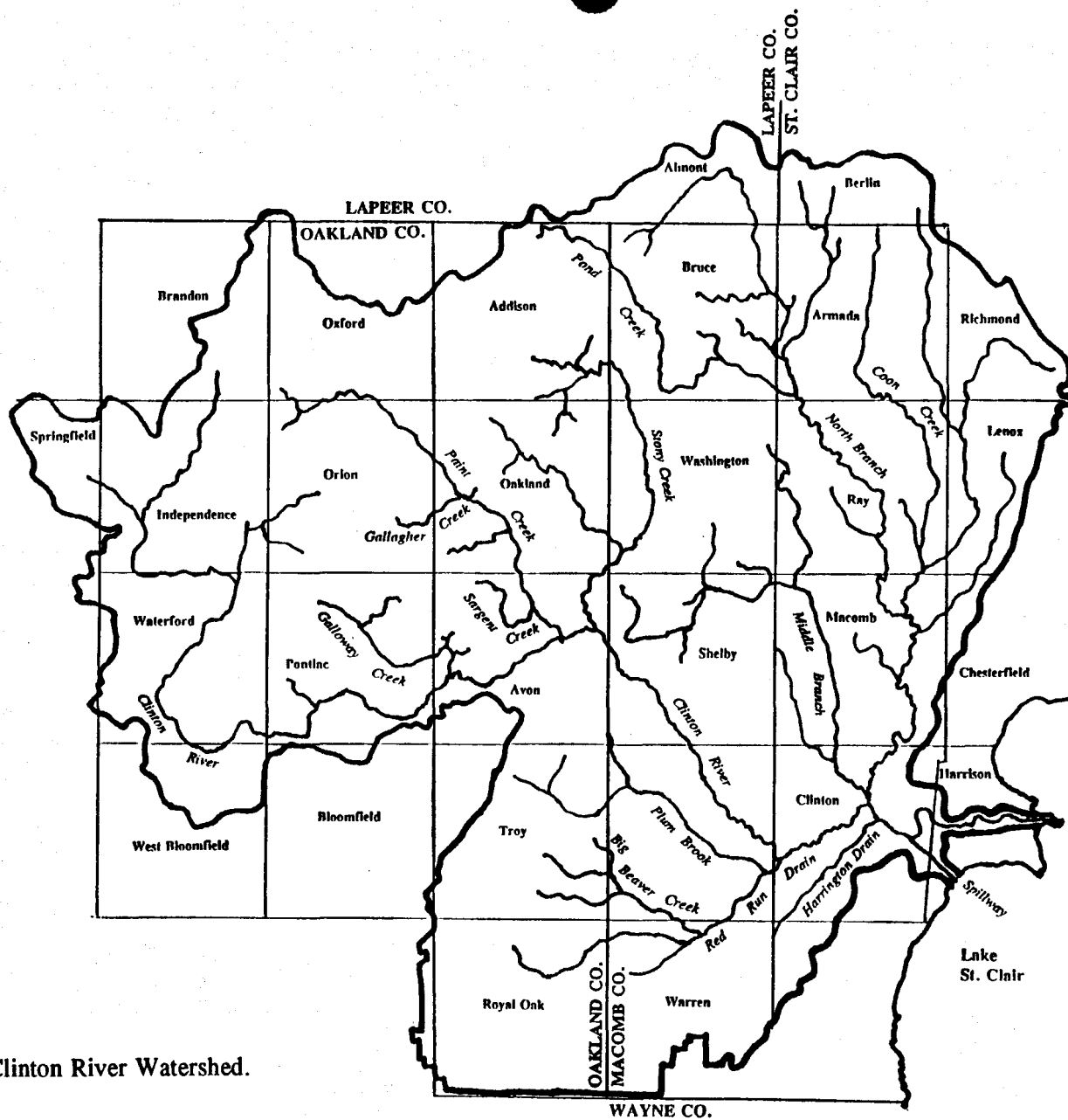


Figure 1.1. Clinton River Watershed.

Table 1.2. Summary of the eight beneficial use impairments in the Clinton River watershed.

| Use Impairment | Scope ¹ | Explanation of Impairment | Control Need ² | Impact to Great Lakes |
|---|--------------------|---|--|-----------------------|
| Restrictions on Wildlife Consumption | L | fish consumption advisory for PCB-contaminated carp caught downstream of Yates Dam; current sources of PCBs are contaminated sediments, and potentially nonpoint sources | contaminated sediments | yes |
| Degraded Wildlife Populations | W | degraded native mussel populations attributable to in-stream sedimentation; zebra mussel may also threaten native mussel fauna warm water fishery impaired by sedimentation, impoundment, changes in hydrology | erosion and runoff erosion and runoff; hydrological impairments | yes |
| Degradation of Benthos | W | benthic communities are impaired throughout the watershed because of sedimentation, and at specific locations because of contaminated sediments | erosion and runoff; contaminated sediments; waste sites | no |
| Restrictions on Dredging Activities | L | guidelines for open water disposal of sediments from the navigational channel are exceeded in the lower Clinton River for PCBs, oil and grease, and metals; confined disposal of sediments required | contaminated sediments; waste sites | no |
| Eutrophication or Undesirable Algae | L | excessive algal growth occurs in the lower Clinton River primarily because of high nutrients from stormwater runoff, and low flow | erosion and runoff; hydrological impairments | yes |
| Beach Closings and other "Full Body Contact" Restrictions | W | CSOs, urban and rural stormwater runoff, failing septic systems, and illegal connections to storm sewers all contribute to elevated fecal bacteria levels in many locations throughout the watershed | erosion and runoff; CSOs; failed septic systems; illegal connections to storm drains | yes |
| Degradation of Aesthetics | W | widespread erosion and in-stream sedimentation; localized algal blooms, habitat degradation, litter | erosion and runoff | no |
| Loss of Wildlife Habitat | W | urban sprawl and insufficient landuse planning: erosion, wetland loss, dams, hydrological changes | urban and suburban development; erosion and runoff; hydrological impairments | yes |

¹Scope of impairment within the watershed
L - localized
W - watershed-wide

²Broad categories of problems that need to be controlled in order to restore the beneficial use. Specific mechanisms for control are outlined in the sections addressing these sources of degradation.

Goals

The Public Advisory Council and the three RAP work groups, Point Sources/Nonpoint Sources, Contaminated Sediments, and Habitat, discussed numerous visions, mission statements, goals, principles and objectives in the process of arriving at a few meaningful yet cohesive goals. The following is a synthesis of the environmental quality goals for the watershed. For the full list of ideas see "Results of a Joint Workshop for Visioning/Goal Setting for the Clinton River Watershed and Remedial Action Plan" (CRWC, 1994). These are not "delisting criteria" for the Area of Concern, but long-term goals for the watershed.

A. Restore and protect the Clinton River watershed from contamination.

1. Reduce body burdens of persistent bioaccumulative substances to a level below established effect levels in wildlife; tumor and deformity incidence rates in wildlife shall be no greater than rates at unimpacted control sites.
2. Consume wildlife from the Clinton River watershed without restriction.
3. No beach closings; eliminate total body contact restrictions.
4. Eliminate objectionable deposits, unnatural color or turbidity, unnatural odors, oil sheens, nuisance algal blooms and litter.
5. Eliminate restrictions on dredge spoil disposal; sediment quality should meet aquatic sediment guidelines.
6. Achieve zero discharge of persistent toxic substances.

B. Restore and maintain healthy, diverse and self-sustaining native wildlife communities and habitats.

1. Eliminate sedimentation problems in the Clinton River basin.
2. Protect existing wildlife habitat and reclaim, restore and enhance viable habitat where possible, with emphasis on in-stream, riparian, wetland and floodplain systems.
3. Prevent the further introduction of exotic species; control their expansion where possible; and eliminate them as techniques become available and resources allow.
4. Eliminate adverse environmental effects caused by recreational activities.
5. Minimize temperature impairments from development (stream widening, vegetation elimination, stormwater).

C. Restore and maintain natural hydrology, as feasible.

1. Streams should be able to flow at run-of-the-river through dams and lake level controls.
2. Restore and maintain connections between wetlands and their sources of water (ground and surface waters), particularly floodplain wetlands.

D. Delisting of the Clinton River as an area of concern, with suitable long-term monitoring and prevention mechanisms in place to ensure the continued integrity of the Clinton River watershed ecosystem.

Chapter 2. Environmental Quality Update

Sediment Contaminants, 1994

Beneficial use impairments directly related to contaminated sediments include degraded wildlife populations, restrictions on dredging activities, degradation of the benthos, eutrophication, degradation of aesthetics, and restrictions on wildlife consumption.

From October to December 1994 a watershed-wide sediment survey (67 sites) was conducted by the U.S. EPA Great Lakes National Program Office, the U.S. Army Corps of Engineers and their consultants ThermoAnalytical, Inc. (TMA), and the Michigan Department of Natural Resources (MDNR) (now the Department of Environmental Quality) Surface Water Quality Division. The Clinton River RAP Contaminated Sediments Work Group was integrally involved in the design of this study. Details of study design and results can be found in the Quality Assurance Program Plans (MDNR, 1994b; TMA, 1994), analytical results (TMA, 1995a and b), and Summary of Results (MDNR, 1995b). Ranges of a very few selected contaminants in four sections of the Clinton River watershed are given in Table 2.1. Because of the very long and diverse list of substances found in river sediments, this table only includes some metals, PCB 1260, lindane, DDT and its breakdown products.

In general, the headwaters regions of the Clinton River do not appear to suffer from serious degradation attributable to toxic contamination. Degraded areas in these reaches of stream are primarily attributable to sedimentation. However, there are several isolated spots requiring follow-up for source identification and control, primarily for metals and some semi-volatile organic compounds. These are: Main Branch of the Clinton River at Dixie Highway in Clarkston, Upper Paint Creek downstream from Newman Road, Salt Slang on the east side of the Garfield Road overpass, Newland Inter-county Drain at the north end of Almont Road conduit, and Coon Creek Inter-county Drain at Pratt Road.

Pesticide contamination, even in the North Branch of the Clinton River, does not appear to be a problem. Although there may be localized effects of pesticides on stream biota following stormwater runoff events, accumulation of these substances in stream sediments is not occurring to any measurable extent.

Sediments of the Main Branch of the Clinton River from Pontiac to the confluence with Red Run Drain are moderately contaminated with metals, petroleum hydrocarbons, some semi-volatile organic compounds and nitrogen. Based on 1994 samples and historical data, it would appear that contamination is fairly widespread throughout this corridor. Although this section of the river is not the most seriously contaminated stretch, follow-up assessment for source identification and better areal definition of contamination is scheduled. Contamination is relatively serious and widespread, and these sediments and their associated contaminants are most likely being transported downstream.

All samples from the Red Run Drain/Plum Brook drainage indicate moderate to heavy contamination of the sediments with metals, petroleum hydrocarbons, a number of semi-volatile organic compounds and nitrogen. Two sediment samples from the middle and lower portions of Red Run drain also have exceedences of guidelines for mercury and PCBs, respectively. Follow-up assessment is necessary to further define the extent and severity of the problem, as well as to identify sources. This needs to be done in conjunction with a comprehensive abatement program. In particular stormwater runoff contributions need to be minimized.

The remainder of the downstream portion of the river and the spillway are the most heavily contaminated reaches of stream in the watershed. Elevated levels of metals, petroleum hydrocarbons, semi-volatile organic compounds, nitrogen, as well as PCBs, DDT, DDE, and DDD are common in the sediments. DDT, and its breakdown products DDD and DDE, where present, are usually, though not always, present in the lower strata of the cores. This most likely reflects historical usage. PCBs, where present, are commonly in surficial sediments as well as deep ones. PCBs were detected in Clinton River sediments generally at less than 3 mg/kg; DDT generally at less than 0.17 mg/kg.

Field sampling for follow-up sediment studies began in September 1995.

Table 2.1. Ranges of selected sediment contaminants in four regions of the Clinton River Watershed in mg/kg.

| Selected Contaminants (mg/kg) | Headwaters | Main Branch from Pontiac to confluence with Red Run Drain | Red Run Drain/ Plum Brook Drainage | Lower River and Spillway |
|-------------------------------|------------|---|------------------------------------|--------------------------|
| Number of sites | 31 | 8 | 6 | 19 |
| Arsenic | 1.3 - 22 | 3.5 - 12 | 4.2 - 13 | 1.71 - 13.1 |
| Cadmium | 0.12 - 2.3 | 0.28 - 2.1 | 0.28 - 4.7 | 0.28 - 17.4 |
| Chromium | 4.0 - 29.0 | 10 - 64.8 | 8.2 - 62 | 2.13 - 340 |
| Copper | 2.9 - 37 | 9.4 - 94 | 10 - 68 | 7.04 - 142 |
| Lead | 4.9 - 50 | 9.7 - 320 | 14 - 120 | 2.6 - 233 |
| Mercury | ND - 0.04 | ND - 0.08 | ND - 0.58 | ND - 0.63 |
| Zinc | 1 - 190 | 48 - 400 | 58 - 410 | 25.3 - 761 |
| PCB 1260 | ND | ND | ND - 0.39 | ND - 3 |
| Lindane (g-BHC) | ND - 0.04 | ND | ND | ND - 0.0083 |
| DDT | ND | ND | ND | ND - 0.17 |
| DDE | ND - 0.022 | ND | ND - 0.022 | ND - 22 |
| DDD | ND | ND | ND | ND - 0.31 |

ND - Non-detectable. Specific detection limits are not noted because they often vary among samples for given contaminants.

Fish Bioaccumulation, 1989

A caged fish study, a recommendation of the 1988 RAP, was conducted on the lower Clinton River and in the spillway from August 29, 1989 to September 26, 1989. PCBs increased from 0.029 mg/kg in the control to 0.108 mg/kg at the mouth of the Clinton River, and 0.072 mg/kg in the spillway after 27 days of exposure. Currently a fish consumption advisory recommends that nursing mothers, pregnant women, women who intend to have children, and children under age 15 not eat carp taken from the Clinton River between Yates Dam and the mouth.

Fecal Contamination, 1994 and 1995

Beneficial use impairments directly related to fecal contamination are beach closings and other "full body contact" restrictions, eutrophication, and degradation of aesthetics. Sources of fecal contamination in the Clinton River basin were implicated in Lake St. Clair beach closings in 1994.

During late summer and autumn of 1994, Michigan MDNR (now MDEQ) district staff sampled 21 storm drains and tributaries to the lower Clinton River Watershed. One set of dry weather data (July 26, 27) and two sets of wet weather data (August 4 and November 1) were collected in the Red Run Inter-county Drain basin, the lower Clinton, and the lower stretches of the Middle and North branches.

The dry weather data strongly suggest that there are connections of sanitary systems to storm drains in the Bear Creek drainage system and possibly in the Red Run Drain, Schoenherr Relief Drain and Plum Brook Creek systems.

Fecal coliform in concentrations greater than the Michigan Water Quality Standard for partial body contact of 1000 counts/100mL were found at seventeen of twenty-one stations during wet weather sampling. Of added significance, during dry weather the partial body contact standard was exceeded at seven stations.

The Macomb County Health Department and other agencies use 10,000 counts/100mL as an indicator of sewage contamination. Eight of the thirteen storm drains had fecal coliform counts in excess of 10,000 counts/100mL in at least one of the dry or wet weather samples. The highest concentrations were found during wet weather and were in Harrington Drain, Red Run Drain, Schoenherr Relief Drain and Bear Creek. These maximum counts ranged from 15,600 to 27,000 counts/100mL. Bear Creek Drain at Van Dyke Avenue exceeded 10,000 counts/100mL during dry weather.

The data on Red Run Drain and Bear Creek Drain were corroborated by studies done by the Oakland County Department of Public Works. They sampled the five tributary storm drains to Red Run Drain and the six tributary storm drains to Bear Creek on at least ten occasions during August and September 1994. All the tributary drains had fecal coliform counts greater than or approaching 1,000 counts/100mL during dry weather. Two tributaries to Red Run Drain and three of the six tributaries to Bear Creek Drain had counts in excess of 60,000 counts/100mL in at least one sample (MDNR, 1994a and references therein).

In a separate study, MDNR staff sampled the Clinton River and Lake St. Clair in August 1994 to determine if fecal bacteria were persisting in the sediments. Following the discharge of fecal material to surface waters, most of the associated bacteria are usually assumed to quickly disperse or die. Sampling indicated, however, that bacteria were living in fine sediments like silt and clay, and in sediments with a high organic content (e.g. decaying leaves). This can prolong the potential risk of exposure to fecal pathogens if sediments become resuspended by bathers, boats, wind or waves.

Fecal coliform, fecal Streptococci, and E. coli data indicate that the sediments in the river, its tributaries, and at the mouth of the spillway are serving as sinks for viable fecal bacteria. Bacteria concentrations in the sediments of Red Run Drain and in the Middle and North branches of the river were very high ($\geq 80,000$ counts/100g fecal coliform; $\geq 65,000$ counts/100g E. coli). The station in the Red Run was downstream of the Southeast Oakland County Sewage Disposal System combined sewage retention treatment facility, the Warren Wastewater Treatment Plant and several urban storm drains that had in earlier studies been shown to be carrying high levels of fecal coliform. The high concentrations in the Middle and North branches indicate the significance of agricultural and rural sources, including residential septic systems. Sampling was repeated at most of these sites in April 1995. Bacteria concentrations were typically an order of magnitude lower, although sites with highest concentrations of bacteria in August were the sites with highest concentrations in April (MDNR, 1995c).

Fisheries Surveys, 1989 to 1995

MDNR Fisheries Division surveys of the lower Clinton River and spillway in 1990 and 1991 did not document any substantial natural reproduction of walleye, and supported phasing out the stocking program.

MDNR Fisheries Division surveys in 1992 and 1994 indicated that water temperatures in the Clinton River near Hamlin Road are too high to continue stocking Brown Trout; these populations are encountering water temperatures near the lethal limit in the summer, and are not over-wintering. Populations near Squirrel Road have fared better.

Fisheries Division also performed a trout population estimate and follow-up survey in Paint Creek from the headwaters at Lake Orion to the confluence with the Clinton River. These surveys were designed to document the effect of the bottom-draw structure constructed at the outlet of Lake Orion. Both surveys showed good survival of trout throughout the stream.

Between 1989 and 1995 MDNR Fisheries Division has surveyed many lakes in the watershed on a rotating basis, and continues to monitor species assemblages and growth.

Paint, Sargent and Gallagher Creeks Biosurvey, 1991

Paint Creek and two of its tributaries, Sargent and Gallagher creeks were surveyed from July 30 to August 1, 1991. Fish communities at all stations were categorized as good (slightly impaired), except for one station on Sargent Creek, which was rated fair (moderately impaired). The stations on Gallagher Creek surpassed all others for coldwater fish. Sites on Paint Creek were also sustaining a good number of Brown Trout.

Macroinvertebrate communities at sites along most of Paint Creek were categorized as good. Stations on Gallagher and Sargent creeks had macroinvertebrate communities rated as fair.

The habitat at all the Paint Creek stations was categorized as either good (slightly impaired) or excellent (nonimpaired) except for the station downstream of Lake Orion. Habitat at this site was rated poor (severely impaired) because of serious sedimentation, and excessive plant growth probably attributable to nutrient enrichment. Water temperatures were also high with the site supporting only warmwater fish and invertebrates. However, it should be noted that the Lake Orion bottom-draw project has since been fully implemented, and this site now supports a cool water community.

Habitat was categorized as fair to poor on Sargent Creek, largely because of bank erosion and an unstable flow regime. Gallagher Creek habitat was rated as good to fair. In-stream sedimentation was serious at several sites.

Nutrient concentrations in this subwatershed were relatively high (MDNR, 1992c).

Coon Creek Biosurvey, 1992

Coon Creek Inter-county Drain, a first order warmwater tributary to the North Branch of the Clinton River was surveyed on June 18, 1992. The overall biological integrity of Coon Creek was rated fair (moderately impaired) based on the macroinvertebrate community rating. The fish community was categorized as good (slightly impaired) at all stations and the physical habitat categories ranged from fair to excellent (nonimpaired) (MDNR, 1992b).

Watershed Biosurvey, 1994

MDNR staff qualitatively evaluated the biotic integrity of the fish and macroinvertebrate communities at 15 sites in the Clinton River watershed in August 1994. Habitat conditions, and sediment and water quality were evaluated as well.

Water quality impairments were identified in the Clinton River downstream of Pontiac. Galloway Creek's habitat was rated poor to fair and the macroinvertebrate biota displayed similar impairment. The upper reaches of Stony Creek and the West Branch of Stony Creek have been subjected to less watershed disturbance, and have good habitat and biological communities. Much of the Middle Branch of the Clinton River has been modified to facilitate drainage and serves to transport water and sediment downstream.

The upper reaches of the North Branch of the Clinton River and East Pond Creek are designated coldwater streams that contain aquatic biota characteristic of good warmwater streams. The habitat of these two streams has been impacted by nonpoint source pollution (primarily agricultural erosion) but the gradient and riparian zone still provide good habitat.

The North Branch of the Clinton River upstream of its confluence with Coon Creek harbors a good (slightly impaired) macroinvertebrate community and an excellent (nonimpaired) fish community. The stream provides a diversity of habitat types and water quality appears good despite nonpoint source agricultural impacts.

The North Branch of the Clinton River downstream of the Coon Creek confluence takes on the characteristics of Coon Creek. The Coon Creek watershed is dominated by agriculture and the clay soils, with low infiltration capacity, yield turbid runoff via a series of agricultural ditches. The lower reach of the North Branch of the Clinton River has a relatively low gradient allowing sediments to accumulate and impair biotic integrity. The large, well-drained watershed produces flows that cause bank erosion. Local residents work to keep the stream channel clear of obstructions and many types of materials have been installed to prevent bank erosion. A summary of biosurvey results are presented in Table 2.2. Details of the study, and data can be found in MDNR, 1995a.

Table 2.2. Summary of biosurvey results for sites in the Clinton River watershed, August 8-25, 1994 (MDNR, 1995a).

| Station and Location | Fish Community Rating | Macro-invertebrate Community Rating | Habitat Condition Rating |
|---|-----------------------|-------------------------------------|--------------------------|
| Clinton River (Ryan Road) | Fair | Good | Excellent |
| Clinton River (Crooks Road) | Poor | Fair | Excellent |
| Clinton River (Squirrel Road) | Poor | Fair | Excellent |
| Clinton River (Elizabeth Lake Road) | Excellent | Good | Good |
| Galloway Creek (Butler Road) | Fair | Fair | Poor |
| Galloway Creek (Walton Road) | Good | Fair | Fair |
| W. Branch Stony Creek (Lake George Road) | Good | Good | Excellent |
| Stony Creek (33 Mile Road) | Good | Good | Good |
| Middle Branch of the Clinton River (23 Mile Road) | Fair | Fair | Poor |
| Middle Branch of the Clinton River (Jewell Road) | Good | Fair | Fair |
| North Branch of the Clinton River (21 Mile Road) | Good | Fair | Poor |
| North Branch of the Clinton River (28 Mile Road) | Excellent | Good | Good |
| East Pond Creek (33 Mile Road) | Excellent | Fair | Fair |
| North Branch of the Clinton River (32 Mile Road) | Good | Good | Good |
| North Branch of the Clinton River (McCay Road) | Good | Fair | Poor |

Overview

The headwaters of the mainstem of the Clinton River upstream of Pontiac are generally in good shape. There are a few isolated areas that we have identified with toxic contaminants (metals, semi-volatile organic compounds) in the sediments; follow-up source control investigations are warranted. Erosion and sedimentation are problems; stormwater management and erosion control measures are important. This region still has some high quality habitat with generally healthy macroinvertebrate and fish communities, however this is disappearing rapidly.

The Galloway Creek subdrainage is relatively free from toxic contaminants. However, erosion and sedimentation are serious problems at many sites, contributing to degradation of macroinvertebrate and fish habitat. High quality streams are dependent upon some aggressive erosion control measures, as well as preventive actions like stormwater management and habitat protection.

The Paint Creek basin contains one of the few remaining trout fisheries in southeast Michigan. Erosion and sedimentation are the most serious problems confronting water quality. Many erosion control measures have already been undertaken here in an effort to protect the fisheries, however more is needed especially on Sargent and Gallagher creeks. We have identified one site on the upper reaches of Paint Creek with concentrations of arsenic, copper, nickel, zinc and lindane that suggest the need for some follow-up source control. However, the basin otherwise does not seem to be seriously impacted by toxic substances. This could change as developed areas become more prevalent. Stormwater management and habitat protection are the most critical needs in this basin.

The Stony Creek subwatershed is generally in good shape. Like most of the Clinton tributaries, it is impacted by erosion. However, there is no indication of serious toxic contamination, and habitat and fish and macroinvertebrate communities are rated as good. As with most of the Clinton River Watershed, preventive measures will determine whether or not water and habitat quality remain good as urban expansion encroaches.

The mainstem of the Clinton River from Pontiac to the Harrington Drain is characterized by poor quality sediments, and impaired fish and macroinvertebrate communities. The potential for good habitat exists. However, toxic contaminants and the problems associated with high stormwater runoff (increased temperatures, unstable flows, high suspended solids) contribute significantly to degradation of this reach of the river. A number of Superfund and other contaminated sites are located along this portion of the river. Follow-up assessment of the sediments in this portion of the river has been planned. Most of this area is already fairly heavily urbanized and industrialized. Measures here will be largely remedial. However, as always, comprehensive prevention measures will be extremely effective also.

The basin of the Middle Branch of the Clinton River is typical of most tributaries in the watershed. Relatively free from toxic contamination, water quality is impaired largely by erosion and changes to natural hydrology. Habitat and fish and macroinvertebrate community health are of only fair quality, mostly because of in-stream sedimentation.

The North Branch of the Clinton River subwatershed is the only remaining portion of the watershed that still supports significant agricultural activity. Agricultural runoff and erosion are the most serious sources of degradation in this basin. Sampling at 14 sites in this basin revealed no serious accumulation of pesticides in the sediments. Two sites requiring follow-up source control for metals and semi-volatile organic compounds were identified at the very northern tip of this sub-basin. Otherwise, toxic substances do not appear to be a prevalent problem. Contaminants of concern are

mostly nutrients and sediments. In addition, stormwater runoff from fields and feedlots and failing septic systems periodically contribute high concentrations of fecal bacteria to these streams. Habitat and benthic communities in the North Branch basin are impaired by in-stream sediment. Fish communities are in relatively good condition. Most critical activities are stormwater run-off and erosion controls, and habitat protection measures.

The Red Run Drain/Plum Brook basin provides probably the most significant remedial challenge in the Clinton River Watershed. The area is highly urbanized and industrialized, and sources of contaminants are many. Sediments are seriously contaminated with metals, semi-volatile compounds, and even localized PCBs. Fecal bacteria contamination is common, with storm drains, improperly functioning septic systems, overflows from the Southeast Oakland County Sewage Disposal System combined sewage retention basin, and stormwater runoff all serving as sources. Because of the high degree of impervious surfaces stormwater controls will need to be largely remedial. Illegal connections to storm drains are suspected of being major sources of bacteria and toxic substances to the river, and will require significant effort to detect and eliminate. Additional assessment of contaminants in sediments is underway; source control will be complicated. Erosion is also a serious problem; Red Run Drain is regularly dredged of sediments. Little high quality habitat remains.

The Clinton River downstream of the weir, and the spillway contain the highest concentrations of most toxic contaminants in sediments, including PCBs, DDT and its breakdown products, metals and semi-volatile organic compounds. Most of these contaminants probably originated from historical discharges rather than ongoing. However, upstream contaminants from on-going sources likely settle here as well. The river is dredged by the U.S. Army Corps of Engineers (USACOE) every few years to maintain navigation, and sediments mid-channel are not as seriously contaminated as sediments outside of the navigational channel. The largest volume of flow is down the spillway, and the highest concentrations of toxic contaminants and fecal bacteria occur at the mouth of the spillway instead of the mouth of the river. Sediment deposition is a serious problem in the lower river as elsewhere in the watershed; flow is virtually nondetectable here because of diversion of water to the spillway. USACOE modifications to the weir, scheduled to begin in 1996, are designed to restore flow in the lower river. Most of the river and spillway along this stretch do not appear to provide high quality habitat, although they are popular fishing areas. The MDNR Fisheries Division decision to eliminate walleye stocking in this portion of the river because of poor reproduction supports this conclusion. However, with the exception of the walleye survey, neither qualitative nor quantitative evaluations of habitat or wildlife communities have been undertaken here recently.

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It is difficult to evaluate the net change in water quality since the 1988 RAP was published. Clearly, problems stemming from point sources are greatly improved, with a reduction from these sources of contaminants like metals and petroleum hydrocarbons. However, because of rapid urban expansion, other sources of these contaminants, like stormwater runoff, introduce greater amounts now than in preceding decades. The diffuse nature of the sources makes these contributions difficult to quantify.

Sediment contaminants of some persistent, bioaccumulative substances like PCBs and DDT now occur at lower concentrations in the lower Clinton River than in the mid-1980s.

There has been a shift from industries producing heavy metal contaminants (e.g. automobile production) to industries producing semi-volatile organic compounds such as phthalates (e.g. plastics production). So while some contaminants are less prevalent, others are on the increase.

In addition, while many industries have greatly reduced or even eliminated discharges to surface waters or to sanitary sewers, there are still many contaminants going up smokestacks and eventually reaching the river. These atmospherically-derived contaminants are difficult to measure, and also difficult to trace to a source.

Fecal contamination, including bacteria and nutrients, from wastewater treatment plants was greatly reduced in the years prior to the publication of the 1988 RAP. In fact, that document concluded that fecal contamination was no longer an impairment in the Clinton River basin. However, because of an increased density of people and impervious surfaces in the last few years, there have been increases in fecal contaminants from failing septic systems, illegal connections to storm sewers, and contaminated runoff originating with domestic animals and wildlife. Many combined sewer systems have been separated and no longer spill raw sewage into the river. However, volume from those that still do overflow is much greater because of expansion of these systems to accommodate significantly more customers. During the summer of 1994 the serious nature of fecal pollution became very apparent, with long-term beach closings and severe economic losses to area businesses. Subsequent investigations have revealed that fecal contamination is a widespread phenomenon in the Clinton River Watershed, with high variability in fecal bacteria concentrations depending on location and season.

In general, it is difficult to conclude if overall water quality in the Clinton River Watershed has improved or degraded over the last seven years. Depending on the time and the location, both have occurred. One thing we can definitely conclude is that the nature of the problem has become more complicated. No longer is the primary challenge to reduce contaminants coming out of pipes at known locations. We now must contend with a diverse array of sources and activities involving nearly every citizen in the watershed.

Chapter 3. Sources of Degradation, Ongoing and Recommended Actions

An update of sources of environmental contamination and degradation is provided in this section. These are brief overviews; should the reader require more details, a list of contacts for more information is provided in Appendix D.

Actions required to eliminate the problems are outlined in this chapter as well. Where a responsible party and/or mechanism for implementation and costs have been determined they are included. In most cases, accurate cost estimates are not possible at this juncture. Where costs are noted to be minimal or "no special funding required", this is generally because funding is ongoing or that the activity can probably be conducted within the current budget with little modification. This does not mean that the recommendation can be implemented without cost, only that the cost is internal to that agency or party and not within the realm of the RAP to estimate.

Recommendations led by a ☒ are those considered to be priority actions, and should be initiated within the next two years. Recommendations led by a ☐ are considered necessary to meeting goals and delisting, but can be considered longer-term, or actions to be pursued on an opportunistic basis.

Industrial Discharges

Major industrial discharges to the Clinton River and its tributaries consist primarily of noncontact cooling water, storm water and other nonprocess effluents. A summary of facilities in the watershed regulated under the National Pollutant Discharge Elimination System (NPDES) is provided in Appendix B. Although vigilance is necessary to ensure continued compliance with water quality standards, permitted industrial discharges are generally not currently considered unacceptable sources of water quality degradation in the watershed.

Recommendations

- Continue monitoring discharges at all facilities, and update permits as required.

Industries with NPDES permits
MDEQ, Surface Water Quality Division

No special funding required

Clinton River Early Warning System (CREWS)

CREWS is a network of citizen volunteers from communities throughout Macomb County trained to identify spills to local streams, drains and rivers, and to report them to the appropriate authority. CREWS also conducts stream clean-ups, storm drain stenciling, and organizes neighborhood educational programs.

CREWS is sponsored by the Macomb County Office of Emergency Services and the Clinton River Watershed Council.

Wastewater Treatment Plant Discharges

Six wastewater treatment facilities are located in and discharge to the Clinton River watershed. The Village of Armada owns and operates a 0.35 MGD (Million Gallons per Day) advanced wastewater treatment plant (WWTP) which discharges to Coon Creek. The Village of Romeo owns and operates a 1.6 MGD wastewater treatment plant which discharges to East Pond Creek. The City of Mt. Clemens owns and operates a 6.0 MGD wastewater treatment plant which discharges to the Clinton River. The City of Warren operates a 36.0 MGD advanced wastewater treatment plant which discharges to the Red Run Drain. The City of Pontiac owns and operates a 15 MGD wastewater treatment plant which discharges to the Clinton River. The Village of Almont operates a 0.47 MGD tertiary wastewater treatment plant which discharges to the North Branch of the Clinton River.

Until July 1994 the City of Rochester owned and operated a 3.0 MGD wastewater treatment plant which discharged to the Clinton River. The City diverted its wastewater flows to the Detroit Water and Sewerage Department collection system and eliminated the wastewater treatment plant. Flows are now treated at the Detroit Wastewater Treatment Plant.

These facilities have been largely in compliance with their permit limits for contaminants of concern, with the exception of isolated incidences of exceedences of guidelines for heavy metals. A summary of these permits and violations is provided in Appendix B.

Industrial Pretreatment Programs (IPP) exist at four facilities. The WWTPs in Romeo and Almont are not required to have Industrial Pretreatment Programs. The City of Mt. Clemens WWTP has been in compliance with its IPP for the last two years. The City of Pontiac WWTP likewise is in compliance. The City of Warren WWTP is in compliance, and was nominated by MDNR for the U.S. EPA's IPP Excellence Award in April 1994. The Village of Armada has been issued a Notice of Violation (NOV) for noncompliance, and is currently required to develop an IPP program.

Recommendations

- More stringent compliance and enforcement of the Industrial Pretreatment Program at Armada.

Village of Armada
MDEQ IPP Program

Costs to be determined
No special funding required

- Continue monitoring discharges at all facilities, and update permits as required.

NPDES permitted facilities
MDEQ Surface Water Quality Division

No special funding required

- All WWTPs undertake pollution prevention programs for households and other facilities in addition to industries.

Local communities with WWTPs

Costs to be determined

Combined Sewer Overflows

Overflows from combined sanitary and storm sewers have contributed and continue to contribute untreated or partially treated sewage to the Clinton River basin following increased wet weather flows. Several formerly combined systems in the watershed have been separated. Two systems continue to overflow to waters of the Clinton River watershed on a regular basis.

The City of Mt. Clemens is a combined sewer community. In addition to the combined sewers which collect residential and industrial wastewater from the community, the City also owns and operates a deep tunnel system and retention basin. The purpose of the deep tunnel system and retention basin is to collect excess wet weather flow from the combined sewer system (flows which would otherwise discharge untreated to the Clinton River through numerous overflow locations) and retain that flow for treatment at the wastewater treatment plant after high flows have subsided. MDNR (now MDEQ) issued a Notice of Violation (NOV) to the City of Mt. Clemens in August 1994 for failure to comply with the terms and conditions of its National Pollutant Discharge Elimination System permit. Specific violations included failure to properly operate the deep tunnel system thereby allowing unauthorized discharges of untreated wastewater to the Clinton River. The NOV contained a schedule requiring the City to develop plans and specifications for elimination of its unauthorized discharges; submit them to the MDNR (now MDEQ) for review and approval; and complete construction. Thus far, the City has complied with the schedule in the Notice of Violation. A new NPDES permit was issued to the City in 1995 which incorporated these requirements.

The Southeast Oakland County Sewage Disposal System (SOCSDS) is operated by the Oakland County Drain Commissioner and serves 14 combined sewer communities in Oakland County. The basin is two miles long, has a capacity of 62 million gallons and discharges treated combined sewage to the Clinton River via the Red Run Drain. The SOCSDS basin was originally designed to provide 30 minutes detention for wet weather flows generated by a 10 year 1 hour storm. However, subsequent growth of the communities has affected this detention time. The basin was constructed in 1971, many years before MDNR or the USEPA developed combined sewer overflow treatment criteria. MDNR (now MDEQ) has recently developed an updated NPDES permit for the SOCSDS Retention Basin. This permit requires the permittee to conduct an in depth evaluation of the basin within two years to determine its treatment efficiency and ability to meet water quality standards. Based on the results of this study, additional upgrades at the SOCSDS basin may be required.

The Village of Armada is a formerly combined sewer community. Armada recently completed separation of their combined system which had eight outfalls to Coon Creek. Armada is currently performing additional rehabilitation of their sewer system to meet design standards.

All other municipalities in the watershed are separate sewer communities.

The City of Warren is a separate sewer community. However, the sewer system does experience inflow and infiltration problems during wet weather, at which time flows exceeding the capacity of the wastewater treatment plant are diverted to an adjacent 50 million gallon retention basin. When wet weather subsides, retained wastewater is drained from the basin and treated at the plant. Wastewater flows which exceed the capacity of the retention basin are discharged to Red Run Drain, however these discharges are very infrequent. The City of Warren has been working to minimize inflow and infiltration to the sewer system.

Recommendations

■ The City of Mt. Clemens should continue to comply with the schedule outlined in the MDEQ Notice of Violation to correct unauthorized discharges.

The City of Mt. Clemens

Costs to be determined

■ New permit requirements for the Southeast Oakland County Sewage Disposal System Retention Basin evaluation should be met. Following this study, upgrades to the system should be made if and as determined.

The communities associated with SOCSDS

Costs to be determined

■ Evaluate the effectiveness of the St. Clair Shores downspout removal program that was initiated in 1995 to determine if eliminating these flows from sewer systems during high discharge decreases combined sewer overflow volume.

Public Advisory Council

No special funding required

On-site Sewage Disposal Systems

A number of communities in the Clinton River Watershed use septic systems to dispose of their wastewater. A few of these areas are presently rural while others were once rural and are now urban.

Septic systems fail for several reasons, including inadequate soils that do not allow wastewater to percolate (i.e. clays), inadequate design and installation, and clogging due to inappropriate use or maintenance following many years of use. Leaking septic systems allow untreated human waste to be directly discharged to the river. Water and sediment quality monitoring in the summer and autumn of 1994 in the Clinton River Watershed indicated that failed septic systems are partially responsible for fecal bacterial contamination in the river and its tributaries.

In 1995, the Clinton River Watershed Council, the Oakland County Health Division and the Macomb County Health Department, with funding from the Michigan Department of Environmental Quality, embarked on a study to identify areas of the watershed with high incidences of on-site sewage disposal system failure. Early results indicate four areas in Oakland County and fourteen in Macomb County with the potential for significant contamination from septic systems. This study has targeted only certain areas of the watershed. To thoroughly evaluate the status of septic systems basin-wide, funding to expand this study to other portions of the watershed is needed.

Testing for failing on-site sewage disposal systems begins with water quality testing in areas serviced by septic systems. Poor water quality suggestive of sewage contamination indicates the need for dye testing. Dye is flushed down the toilets in area homes with septic systems. Dye leaching from septic systems into the river is absorbed by charcoal packets placed in-stream. Dye in the charcoal packets can be detected in the lab, indicating that the septic system is a source of fecal contamination.

Recommendations

■ Adequately fund the cooperative effort between the Oakland County Health Division, the Macomb County Health Department and the Clinton River Watershed Council to identify failing septic systems. 1995 funding has been secured through fines and penalties from the G&H landfill settlement, however funding in subsequent years will be required.

Oakland Co. Health Division
Macomb Co. Health Department
Clinton River Watershed Council

\$40,000 annually for 3-5 years

- Regularly inspect all on-site sewage disposal systems within the watershed.

Oakland Co. Health Division
Macomb Co. Health Department
St. Clair County Health Department
Lapeer County Health Department

Costs to be determined

■ Institute preventive and corrective action for non-functional septic systems.

Oakland Co. Health Division
Macomb Co. Health Department
St. Clair Co. Health Department
Lapeer Co. Health Department
Owners of septic systems

Costs to be determined

■ County health departments should investigate and recommend alternative technologies in areas where septic systems and sewers are not highly feasible sewage disposal methods.

all county health departments
Clinton River Watershed Council
SEMCOG

Minimal special funding
should be required

- Oakland County Health Division continue the implementation of its recently adopted septic density ordinance.

Oakland County Health Division

Minimal special funding

■ Macomb County adopt stricter standards for siting local septic systems.

Macomb County Health Department
Macomb County Commission

Costs to be determined

On a related topic, septage disposal and management contribute to water quality problems in the Clinton River watershed as elsewhere, although no data exist to quantify the extent of the problem. There are few regulations and no oversight of septage disposal, and management programs are needed.

- Establish and support a state-wide septage disposal management program.

local state legislator
SPAC

Costs to be determined

- Local governments should implement septage management programs.

all local governments within the
Clinton River watershed

Costs to be determined

Illegal Connections

Illegal connections to storm sewer systems have been identified as a problem in the Clinton River Watershed. Wet and dry weather sampling of storm drains for fecal bacteria in 1994 indicated that illegal connections are a source of sewage to the river. Other contaminants undoubtedly reach the river via this route as well.

The Macomb County Department of Public Works has begun the arduous task of finding and eliminating illegal connections to storm drains. So far their efforts have not met with a great deal of success.

Recommendations

- ☒ Form a Red Run Drain Pollution Abatement Project/Program funded by a drainage district assessment.

| | |
|---|------------------|
| Macomb and Oakland county departments of public works | \$2/yr/household |
| Macomb and Oakland county health departments | |

- ☒ Provide Macomb County DPW full support and resources to continue their illegal connections detection program.

| | |
|--------------------------|------------------------|
| Macomb County government | Costs to be determined |
|--------------------------|------------------------|

- ☒ Initiate an illegal connections detection program in Oakland County.

| | |
|---------------------------|------------------------|
| Oakland County government | Costs to be determined |
|---------------------------|------------------------|

Urban Stormwater Runoff and Erosion

Polluted stormwater runoff is a major cause of impairment in most areas of the Clinton River Watershed. Runoff and erosion are directly responsible for six of the eight beneficial use impairments in the Clinton River AOC. This nonpoint source pollution is intermittent and usually occurs as the result of precipitation when water moving over the surface picks up pollutants deposited from the atmosphere or derived from activities related to land use. This makes them difficult to assess and control. Urban nonpoint source pollution control focuses on industrial, commercial, and residential land uses and highways.

Urban development in a watershed introduces impervious surfaces which redirect rainfall from infiltration to surface runoff. Runoff volume may increase from 5-10% in a natural watershed to as much as 90-95% in a fully urbanized watershed. Historically stormwater management efforts have been focused on minimizing flood damages. 1987 amendments to the federal Clean Water Act introduced two programs for control of nonpoint source pollution.

In urban areas stormwater is regulated through the National Pollutant Discharge Elimination System (NPDES) permit program. Point source stormwater discharges are defined as water from designated outlets originating from industrial sites, construction sites, and municipalities with populations of 100,000 or more served by separate municipal storm sewers. Management usually focuses on remedial measures in developed areas.

Stormwater that is not regulated through the NPDES program is considered nonpoint source pollution. The Section 319 (Clean Water Act) Nonpoint Source Control program focuses on watershed demonstration projects and on Best Management Practices (BMPs) to control pollution at the source (on-site). Recently local and regional planning efforts have resulted in some prevention strategies. Stormwater management practices have begun to address water quality and ecological issues more directly, in addition to flood mitigation.

The Clinton River Watershed Council has recently completed the Gallagher Creek/ Paint Creek Nonpoint Source project, under 319 planning and implementation funding from USEPA/MDNR (MDEQ) to Oakland Township. The Council produced a guidebook, *Controlling Stormwater Runoff from New Developments*, twelve public information brochures "Stormwater Management: Protecting Paint Creek", a poster, a draft *Oakland Township Design Manual for Subdivision Drainage*, and an updated draft Stormwater Management and Erosion Control Ordinance for Oakland Township.

Erosion from streambanks and construction sites introduces significant amounts of sediment into the stream, where it eliminates habitat for insects, fish and other organisms. Erosion can cause loss of trees and other streambank vegetation. Increased solids can also facilitate increased water temperature, decreased oxygen, and act as a substrate to introduce and transport contaminants. Public expenditures for clean-out of sediment from drains, and U.S. Army Corps of Engineers removal of sediment from the lower river navigation channel are enormous. It has been estimated that one cent spent on erosion control at the source will provide the benefits of one dollar spent on dredging downstream.

Currently, authority to comprehensively manage stormwater and prevent erosion rests mostly with local governments. This task is somewhat daunting since effective stormwater management should be undertaken on a watershed, or subwatershed basis, necessitating cross-jurisdictional planning and management.

With funding from the G&H Landfill settlement, MDEQ is overseeing implementation of BMPs at three sites in the Clinton River watershed. Streambank stabilization to maintain the trout fishery is being undertaken along Paint Creek. At River Bends Park in Shelby Township Clinton River streambanks are being stabilized to prevent further erosion. The river channel is being restored at Yates Cider Mill following many years of widening attributable to erosion.

Recommendations

- Pass stormwater ordinances which encourage measures such as taxing parking lot space; crediting preservation of trees, green spaces and pervious surfaces; utilizing BMPs such as filter strips; using on-site storm water basins to control and treat parking lot runoff; and retrofitting existing parking lots with devices that will filter out contaminants.

All local governments
Clinton River Watershed Council (educational assistance)

costs to be determined

- Cooperatively undertake watershed stormwater management planning, and incorporate water quality as well as water quantity into criteria.

All county drain commissioners

costs to be determined

- Educate site planners, engineers, builders, developers, and contractors about the importance of protecting the river (including the economic advantages), about the planning and implementation of best management practices for stormwater runoff control, and about services and assistance available from the U.S. Department of Agriculture/Natural Resources Conservation Service and other agencies with stormwater management expertise.

Clinton River Watershed Council
MDEQ (technical assistance)

\$50,000

- For storm sewers and drains containing excessive levels of bacterial contamination, determine responsibility for control of the discharge and require implementation of actions to obtain corrections.

county departments of public works
county drain commissioners

costs to be determined

- Identify ownership and maintenance responsibilities of drainage systems. Note: Mapping of Red Run Drain by EPA, and Warren and Sterling Heights as part of the stormwater program application should be completed.

local governments
drain commissioners
Clinton River Inter-county Drainage District

costs to be determined

- Pending a positive evaluation of the Clinton River Watershed Council program to train local building inspectors to provide on-site inspections for stormwater runoff BMPs at construction sites, further implement this strategy throughout the watershed.

Clinton River Watershed Council
local enforcing agencies
county enforcing agencies

\$30,000

- Increase awareness of vegetative buffer strips along streams and drains via newsletters and newspaper articles, and by working one-on-one with landowners.

Natural Resources Conservation Service
Cooperative Extension Service
Huron-Clinton Metropolitan Authority

costs to be determined

- Map critical slope areas in the watershed. Incorporate into watershed database.

Soil and Water Conservation Districts
Natural Resources Conservation Service
Oakland University (database)

costs to be determined

- Preserve and create vegetative buffer strips along the river to filter runoff as well as provide valuable wildlife habitats.

drain commissioners
Soil and Water Conservation Districts
township zoning boards
county planning officials
Natural Resources Conservation Service
all riparian landowners

costs site specific

- Undertake erosion control at road stream crossings and avoid direct pipe discharges of road runoff to surface waters.

county road commissions

costs to be determined

- Develop a uniform soil erosion and sedimentation control program throughout the watershed to maintain better compliance with the regulations. This program should include: 1) Limiting the maximum area exposed at one time for construction activities (i.e. 20 to 40 acres), 2) Requiring storm water basins that treat runoff for removal of sediments not just control of rate of discharge on all projects larger than 10 acres in total size, 3) Establishing minimum standards for erosion control practices to be used during construction activities and 4) Establish a minimum standard for how often inspection will be performed by the responsible regulatory agency.

county commissions
local enforcing agencies
county enforcing agencies
Clinton River Watershed Council (educational assistance)

costs to be determined

- Encourage staging and scheduling of construction activities, and immediate critical area revegetation to reduce discharges of suspended solids to watercourses. Create a local financial ordinance/incentive by charging \$50/acre/month for bare soil at construction sites.

county commissions
local enforcing agencies
county enforcing agencies

little special funding required

- Further study the impacts of road de-icing and consider possible alternatives.

county road commissions
Michigan Department of Transportation

costs to be determined

- Redirect 20 percent of each county's road commission road ditch maintenance budget to the SWCDs for technical help and cost sharing of erosion control practices.

county road commissions

redirect current funding

- Make Natural Resources Conservation Service and Drainage Districts eligible for state revolving fund and wastewater construction grants for purposes of installing erosion control practices in the watershed.

Association of County Drain Commissioners
Association of Conservation Districts
state legislature

no special funding required

Construction in the Clinton River Watershed contributes many thousands of tons of soil to the river and its tributaries each year. Unfortunately local agencies charged with enforcement of erosion control at these sites are usually understaffed, and inspections for problems are inadequate.

The Clinton River Watershed Council, with funding from the G&H Landfill settlement, is undertaking a program to train building inspectors how to identify erosion problems and construction site best management practices. Inspectors will also be informed about how to report erosion problems to local enforcement agencies, who can then follow-up on suspected noncompliance. Since building inspectors are frequently on-site at construction locations, this should significantly help the local enforcing agencies to curb erosion in the watershed.

Agricultural Stormwater Runoff and Erosion

Stormwater runoff and erosion from agricultural lands can contribute significantly to water quality problems. Mismanagement of animal waste from farm animals can result in high levels of bacteria and nutrients in surface waters. As well, excessive amounts of pesticides and fertilizers can be carried off of croplands in stormwater runoff along with significant amounts of suspended solids.

Agriculture is concentrated primarily along the North Branch of the Clinton River in Macomb, Lapeer and St. Clair counties, and some isolated headwaters areas in Oakland County. Most of the agricultural land in Oakland county is considered highly erodible. No more than 20% is so designated in Macomb County. However, since there is significantly more farmland in Macomb County than in Oakland County, the amount of erodible farmland is greater in Macomb County. Erosion is a very serious problem along these reaches of stream; sediment is considered the most significant contaminant. 1994 sediment sampling indicated that pesticides are not persisting in the sediments, however nitrogen and phosphorus occur at fairly high concentrations.

Conservation tillage practices, such as leaving crop residue on the field instead of plowing it under, prevents wind and water erosion of significant amounts of soil. In 1988, there were essentially no farms in Macomb County utilizing these methods. Since then the Natural Resources Conservation Service has worked with many producers, and 40% of the farmland in Macomb County is now under some form of conservation tillage.

The U.S. Department of Agriculture is leading a multi-agency undertaking to develop resource management plans for the southeast Michigan river basins. These plans will focus on the effects of agricultural practices on water quality. The Clinton River Watershed Local Coordinating Committee is being organized by the Macomb County NRCS district conservationist. Because of the overlap between this committee and the RAP nonpoint source efforts, the RAP will be participating in the undertaking. RAP participants have identified this as a promising venue for implementing solutions to many of the agricultural nonpoint source problems in the watershed.

Recommendations

■ Seek additional funding to employ a technician to help landowners make management changes to reduce off-site sediment delivery.

Natural Resources Conservation Service
Clinton River Watershed Council

\$60,000 annually

● Develop cost share practices using NRCS standards and the Generally Accepted Agricultural Management Practices to provide a uniform basis for a cost share program of erosion control practices funded by the State Revolving Fund.

Michigan Department of Agriculture

costs to be determined

■ Allocate 0.01 mil of local property tax to fund NRCS technical programs and provide cost share funds for management practices that reduce off-site sediment delivery.

county boards of commissioners

reallocation of current funds

☒ Educate residents about the hazards to humans, wildlife and the environment from the unregulated feeding of wildlife.

Huron-Clinton Metropolitan Authority
Clinton River Watershed Council

costs could be minimal

• Enact local ordinances that ban residents' feeding of wildlife (e.g. ducks and geese).

local governments

no special funding required

☒ Monitor and correct animal waste problems on the Clinton River.

Michigan Department of Agriculture
county health departments
Natural Resources Conservation Service
Soil and Water Conservation Districts

costs to be determined

☒ Coordinate the annual work plans of the four Soil and Water Conservation Districts in the Clinton River watershed.

Michigan Department of Agriculture

no special funding required

☒ Help livestock producers and riding and boarding stable managers develop and implement manure management plans.

Natural Resources Conservation Service
Cooperative Extension Service
Soil and Water Conservation Districts

costs to be determined

☒ Continue to seek help from the MDEQ Surface Water Quality Division in preparing grant proposals under Section 319, as well as other funding sources for NPS watershed projects in the Clinton River Watershed.

Natural Resources Conservation Service
local governments

no special funding required

☒ Identify and prioritize joint efforts on the agricultural uplands and drains in the watershed.

Natural Resources Conservation Service
drain commissioners

no special funding required

Habitat Loss and Degradation

There are very few relatively "natural" areas remaining in the Clinton River Watershed. Ecological integrity is threatened on all fronts as urban and suburban development continues at a very rapid rate in Oakland and Macomb counties.

The Oakland County Natural Features Inventory identified areas exemplifying significant pre-settlement ecotypes. The Oakland Land Conservancy is working to acquire or otherwise protect these and other lands worthy of preservation. In 1994 the Conservancy acquired 24 acres of river corridor in Rochester Hills, and an 80 acre conservation easement on Paint Creek.

Urbanization has impaired in-stream habitat by increasing runoff resulting in channel enlargement, increasing sedimentation, increasing water temperature, altering streamside vegetation, and a myriad of other effects. Wetland losses in the watershed are estimated to be at least 75% and increasing. Upland habitats, which also play a role in water quality, have been altered and destroyed as well.

A number of habitat protection and improvement projects have occurred in recent years.

In 1991 the Lake Orion/Paint Creek improvement project tapped cold water from the bottom of Lake Orion for discharge to Paint Creek. By ensuring cool bottom draw water flows from the Lake into the Creek, habitat for Brown trout and cold water aquatic invertebrates was improved.

In 1991 the Michigan Nature Conservancy purchased property in Waterford to protect Elizabeth Lake Woods. The 207 acre property, now known as the Elizabeth Lake Woods Township Park, includes a dry mesic southern oak forest, wetlands and a section of the Clinton River.

In 1992 a gift of 25 acres of main branch river corridor located in the City of Rochester Hills within the Heron Ridge Subdivision was made to the Oakland Land Conservancy. This property is rich in a variety of natural resources including a small Great Blue Heron rookery, stands of hardwood and wetlands.

The Clinton Valley Chapter of Trout Unlimited has been actively involved in habitat restoration projects and stream bank protection activities on Paint Creek.

The Rails-to-Trails Conservancy of Michigan has initiated Greenways, a project to provide a network of protected natural areas throughout southeast Michigan. Greenways objectives also include public education and involvement, as well as natural resource inventories.

A number of local stewardship endeavors like annual stream clean-ups by several organizations in the watershed, and adopt-a-stream programs are important citizen grass roots efforts. More involvement in projects like these are important to conservation efforts in the Clinton River Watershed.

The Paint Creek Trailway is a cooperative venture among local governments in developing a system which connects habitat on the Clinton River and Paint Creek. The Paint Creek Trailway Commission is working with the University of Michigan School of Natural Resources to inventory natural points of interest within the right-of-way, investigate adjacent parcels of land which may be incorporated into the system, and assist in habitat management decisions.

A headwaters protection project has been undertaken by a task force of the Southeast Michigan Areawide Quality Board. A videotape of headwaters protection measures was completed in 1995.

There is general agreement that the best strategy for habitat preservation in the Clinton River watershed is the identification and protection of high quality natural areas through a variety of mechanisms (e.g. conservation easements, land trusts, acquisition). Since protection and prevention are much more cost effective than remediation, headwaters regions should receive a significant amount of attention now. In addition, comprehensive land use planning that takes into account the importance of stormwater management, natural area preservation, and other facets of wise land use, needs to be incorporated into the planning activities of all local governments.

Recommendations

- Assess what inventory information is available, complete a habitat inventory of the Clinton River watershed, identify high quality sensitive areas, natural features and special status species. Create an inventory of dedicated conserved lands. Integrate information into a comprehensive database system.

MDNR

costs to be determined

Oakland and Macomb county governments

local governments

SEMCOG

Huron-Clinton Metropolitan Authority

Clinton River Watershed Council

Oakland University (database)

Natural Resources Conservation Service

- Preserve stream margin habitats, including floodplains and wetlands, by incorporating habitat protection into land use planning and zoning (controlling development in the stream corridor through setbacks, vegetative buffers, open space preservation, etc.).

local governments

little special funding required

Clinton River Watershed Council (technical assistance)

- Evaluate and determine sites for habitat improvements; in-stream and riparian corridor. Prioritize.

Public Advisory Council

little special funding required

RAP Habitat Work Group

Trout Unlimited

MDNR and MDEQ

Clinton River Watershed Council

local governments

- Acquire, restore, and protect conservation lands, including sensitive, rare, high quality areas and fragmented habitats.

Michigan Nature Association
Nature Conservancy
Southeast Michigan Land Conservancy
Oakland Land Conservancy
local governments
Huron-Clinton Metropolitan Authority
County Parks Departments

costs to be determined

- Complete Clinton River fisheries watershed assessment.

MDNR, Fisheries Division

program funding to be allocated
as part of FY budget when
survey is scheduled

- Restore in-stream habitat for sustainable communities of game, forage and other native fish species.

Trout Unlimited
MDNR
local governments
land conservancies

costs to be determined

- Enhance public education and public participation programs to increase citizen awareness and citizen stewardship in the Clinton River Watershed.

County Extension Service
Huron-Clinton Metropolitan Authority
Clinton River Watershed Council

costs program specific

- Restore migration ability and spawning habitat of fish by facilitating upstream and downstream passage at dams and barriers, by removing nonfunctional dams where appropriate, and by prohibiting construction of lake level controls.

MDNR and MDEQ
local governments

costs to be determined

Hydrology

Because of the geology of the area and the ever increasing amount of impervious surfaces attributable to urbanization, the Clinton River Watershed suffers from variable stream flow. Stream channels and banks are scoured by high stream flow. Low flows during dry periods, and high flows during rainstorms and snowmelt can result in degraded wildlife populations, degraded benthos, loss of wildlife habitat, and degradation of aesthetics.

The importance of wetlands and groundwater recharge areas in controlling hydrology is highly dependent upon their connections to water. Seawalls, dredging, draining, etc. cut wetlands off from their sources of water. Increasing impervious surfaces in groundwater recharge areas can also be detrimental.

Modifications to the spillway weir are expected to begin in 1996. The U.S. Army Corps of Engineers plans to place an inflatable weir atop the existing structure to divert more water to the Clinton River during low flow. The modified weir will be adjusted during high flow to allow flood waters down the spillway. This renovation is expected to increase flow in the lower river, which should eliminate stagnant water conditions. There is some concern that increased flow in the lower river may resuspend contaminated sediments. Prior to installation of the new structure, accumulated sediments above the weir will be removed, and modifications will be made to allow fish passage and some water flow around the weir.

Recommendations

■ Protect the functions of wetlands and floodplains as water retention structures for high flow conditions and for use as natural filters as part of stormwater management systems. Encourage practices that eliminate or mitigate effects of seawalls (i.e. rip-rap), and other activities which isolate wetlands and floodplains from surface waters.

local governments
MDEQ

little special funding required

■ Protect headwaters and tributaries from further channelization by incorporating flow patterns into criteria for drain design and stormwater management, and by developing alternatives to current drainage practices.

county drain commissioners

little special funding required

■ Restore recruitment of woody debris by: 1) developing and protecting wooded greenbelts on public and private lands, and 2) appropriately managing and coordinating stream clean-ups.

1) local governments
county parks departments
2) Clinton River Watershed Council

little special funding required

■ Identify important areas of groundwater recharge; develop a strategy to protect these areas.

local governments

costs to be determined

- Establish, perpetuate and use a hydrological model of the Clinton River, including the storm drain conveyance system. Determine a base flow and flow variability which can be achieved in the Clinton River. Use the model to evaluate future land use alternative scenarios to provide information to local government officials and watershed residents.

Oakland University (institutional home)
U.S. Geological Survey
U.S. Army Corps of Engineers
drain commissioners
MDEQ, Hydrologic Studies Unit

costs to be determined

- Determine retention and detention measures which can be implemented to achieve the base flow and variability target for the river. Infiltration practices should be used where possible. Work should be targeted to upstream and headwater areas as much as possible. Storm water from new construction should not leave the site if it would exceed the capacity of the storm drainage system.

U.S. Geological Survey
U.S. Army Corps of Engineers
drain commissioners
MDEQ, Hydrologic Studies Unit

costs to be determined

- Restore summer base flows by establishing minimum flow requirements downstream of all lake level control structures. These may include: amending the Lake-level Control Act; operating lake-level control structures as fixed-crest structures rather than by movable gates; administrative or legal processes; physically modifying dams to permit run-of-the-river flows; operate dams based on river inflows, not impoundment levels.

drain commissioners
local governments
MDEQ

costs depend on method(s)

- Develop a watershed plan which provides for implementation of control measures in a way that provides water quantity and quality benefits while allowing sufficient time for communities to install management measures which will provide the maximum benefit to the river.

Public Advisory Council
Clinton River Watershed Council
local governments
drain commissioners
MDEQ

costs to be determined

- Develop a basinwide log and debris jam master plan for public ownership areas. The plan should include a primer on river restoration techniques designed for use by public agencies and individual citizens. The master plan should be implemented in conjunction with improvements in water quality and adjacent park land.

Clinton River Watershed Council

costs to be determined

Contaminated Sediments

Sediments in the lower portion of the Clinton River Watershed from Pontiac downstream are moderately to heavily contaminated with metals, semi-volatile organic compounds, petroleum hydrocarbons, and even PCBs and DDT. The 1994 assessment provided an overview of contamination in the watershed. The 1995 assessment will better define contamination in the areas found to be heavily contaminated, and also begin to identify sources.

Recommendations

- Complete on-going assessment to identify sources, determine severity of contamination in priority zones including effects on biota, define sediment dynamics, and make remedial decisions.

USEPA/MDEQ/USACOE

\$150,000 per year
for 3 years (1996-1998)

- Approach potentially responsible parties, as feasible, for help with further assessment and possible clean-up.

USEPA/MDEQ
Public Advisory Council

little special funding
should be required

- Control sources of contaminants.

responsible parties
MDEQ
local governments

costs site specific

- Implement remedial measures as necessary.

responsible parties

costs to be determined

Contaminated Sites

Old dump sites and buried storage tanks pose a threat to water quality as contaminants leach from the site to surface and ground water.

Many contaminated sites are regulated through Part 201 of the Natural Resources Environmental Protection Act of 1994, as amended (formerly PA 307 of Michigan's Environmental Response Act), which provides for the identification of contamination and any parties responsible for the contamination, risk assessment, evaluation, and cleanup of these sites. Four contaminated sites in the Clinton River Watershed are on the National Priorities List (Superfund) and are regulated by the U.S. EPA.

Oakland and Macomb Counties have 1250 identified contaminated sites: 1,061 leaking underground storage tanks and 182 sites formerly referred to as 307 sites. Around 1,000 of these sites are in the Clinton River Watershed. Cleanup and/or assessment activity is occurring at 97% of the LUST sites, and 73% of the "201" sites.

Five of the most seriously contaminated sites in Macomb County are ready for final cleanup or cleanup is already underway, with the responsible parties funding the cleanup: G&H Landfill, Liquid Disposal, J&L Landfill, SMDA 9 and 9A, and Lakehead Pipeline.

Selfridge Air National Guard Base recently signed a Consent Order agreeing to remedial action at several contaminated sites on the base. Clean up includes Part 11 (formerly Act 64) closures of a popping furnace site, an exploding ordinance disposal range, and fire training areas.

The G&H Landfill, a closed landfill located along the Clinton River between Rochester and Utica, is on the U.S. EPA's National Priorities List (Superfund) because of contamination of groundwater and surface water. In May 1995, the U.S. EPA announced that the design for final G&H Landfill remediation was complete. The plan includes a multilayer impermeable cap over the landfill, an underground slurry wall to prevent the migration of contaminated groundwater, pumping and treatment of contaminated groundwater outside the landfill, and additional wetland creation to replace wetlands that will be eliminated by remediation. The treated groundwater will be discharged to wetlands between the landfill and the river. The U.S. EPA expects construction to begin in September 1995 and to be completed by November 1998. The groundwater pumping and treatment and monitoring of the cap will continue indefinitely.

Because there was a danger of chemical contamination in surface water, sediment and soil in wetlands south of the G&H Landfill, a portion of the Rochester-Utica State Recreation Area (River Bends Park) was closed in 1987. Investigations by the U.S. EPA have found that the contamination south of the landfill is confined to a relatively limited area. The rest of the State Recreation Area will be re-opened after the remediation construction has been completed.

Recommendations

- Include in a database available to the public all identified sites in the Clinton River basin, including: location, ownership, extent of contamination (based on chemical and biological evaluations), and progress towards remediation.

Oakland University
Michigan Department of Environmental Quality

costs to be determined

- More effectively identify and track progress at sites of environmental contamination that are contributing to or have the potential to contribute contaminants to the Clinton River.

Clinton River Public Advisory Council
state and county health departments
MDEQ, Waste Management Division
MDEQ, Environmental Response Division

costs to be determined

- Evaluate existing groundwater data or gather additional information regarding leachate from abandoned dumps and waste sites and determine the contaminant loading to the groundwater and/or surface water.

county health departments

costs to be determined

Landfills and other Waste Facilities

MDEQ's Waste Management Division (WMD) regulates active and inactive landfills, waste transfer stations, waste processing plants and hazardous waste treatment, storage and disposal facilities. Active landfills are either operating or undergoing their 30-year postclosure monitoring. Inactive landfills are those that are closed and their monitoring period is complete. Potential impacts from these landfill facilities include the illegal discharge of leachate to the surface water or groundwater from leaking waste disposal cells, storm water runoff from the perimeter of the landfill site which may become contaminated if not properly controlled, and refuse that blows away from the active fill area. A summary of some of the potentially problematic landfills is provided in Appendix C.

Recommendations

■ Sample any surface water or groundwater discharge from any WMD regulated facility suspected of having a negative effect on the watershed. County governments should incorporate sampling of these facilities into their solid waste management plans.

county governments
MDEQ, Waste Management Division

costs to be determined

■ Perform inspections of existing conditions at inactive landfills in the Clinton River Watershed which are regulated by WMD.

MDEQ, Waste Management Division

costs to be determined

■ Correct any environmental or operational problems at the facilities to eliminate contamination to the Clinton River Watershed.

MDEQ, Waste Management Division
county governments

costs site specific

- Educate owners and operators of junk yards about pollution prevention.

County Extension Service

costs to be determined

- Obtain enhanced regulatory control over junk yard facilities.

local and state legislators

little special funding
required

Household Hazardous Waste

Household hazardous wastes include many commonly used chemicals, such as paint thinners, car batteries, various cleaners, furniture polishes, insecticides, and glues. These substances can find their way to the river through municipal sewer systems, septic systems, storm drains and stormwater runoff.

There are a number of efforts addressing one or more of these contaminants, such as the Michigan Department of Agriculture Clean Sweep Program which collects old pesticides and containers, local recycling centers, and storm drain stenciling efforts. However, in many parts of the watershed, and for many types of wastes programs do not exist.

Recommendations

- Evaluate existing programs and facilities. Assess and determine need for improvement, by 1996.

County Extension Service
Clinton River Watershed Council
county planning departments

little special funding required

- Deliver programs to educate the residents about what they can do to reduce pollution to the river (yard care, household hazardous waste disposal/alternatives).

County Extension Service
local governments
South Macomb Disposal Authority
SOCRRRA

costs to be determined

- Where inadequacies exist, provide facilities and programs for collecting, recycling and disposing of household hazardous waste products, including development of a handbook explaining how to properly dispose of waste, and where to recycle waste. Incorporate into county solid waste management plans.

local governments
county governments

costs to be determined

- Continue and expand storm drain stenciling program to eliminate dumping of residential hazardous wastes down storm sewers.

Clinton River Watershed Council

little special funding required

- Encourage schools to incorporate into their curriculum the use of environmentally sound practices at home (e.g. safe pesticide use or alternatives, hazardous waste disposal/alternatives).

County Extension Service
Clinton River Watershed Council
local school boards

little special funding required

Air Deposition

Pollutants discharged into the air by industries, automobiles and other sources can settle on bodies of water, or be introduced directly or through runoff with rain and snow. One obstacle in eliminating pollution from airborne sources is that it can be carried from hundreds or even thousands of miles away.

Recommendations

- Determine the atmospherically derived pollutants which contribute to the use impairments of the Clinton River, and quantify the atmospheric inputs of these pollutants.

Currently no feasible mechanism

costs to be determined

- Quantify the air emissions originating in the Clinton River Watershed, when the MDEQ Air Quality Division RAPIDS database comes on line in 1996.

MDEQ, AQD

no special funding required

- Monitor new technologies, including biomonitoring, for quantifying and determining effects of atmospheric emissions and deposition.

Public Advisory Council
MDEQ

no special funding required

Chapter 4. Tracking Progress

Monitoring and Data Management

Current Monitoring Programs

Currently, U.S. EPA monitoring programs are limited to some monitoring at Superfund sites; there are four sites in the watershed. U.S. EPA Great Lakes National Program Office has funded two years (1994 and 1995) of sediment assessment in the Clinton River watershed. However, due to budget cuts they anticipate no money to continue this work in 1996 or beyond.

U.S. Geological Survey maintains five water quality monitoring stations in the watershed, which provide data on several physical and chemical parameters on a monthly basis. USGS is planning a Lake Erie basin study on water quality, and have tentatively expressed an interest in focusing on the Clinton River watershed.

The Michigan Department of Environmental Quality Surface Water Quality Division conducts annual effluent compliance sampling at major NPDES-permitted facilities. The Division also undertakes ambient water quality sampling in association with the five year NPDES permit cycle; biosurveys and other water quality investigations generally take place in the watershed during the year prior to the reissuance of permits. The Division also conducts fish contaminant monitoring. The SWQD conducts water quality assessments in association with spills, fish kills, and other noted crises, however there are insufficient resources for regular, continuous monitoring.

MDNR Fisheries Division conducts occasional fish surveys in conjunction with stocking programs, and as other needs arise. The Division is currently planning a watershed wide inventory, however this study is not yet scheduled.

As requirements of the NPDES permit program, many facilities are required to conduct weekly, monthly or quarterly monitoring of their discharges. These data are reported to MDEQ usually on a monthly basis.

County Health Departments sample known swimming areas on a regular basis during the swimming season for E. coli bacteria and other potential indicators of human pathogens. They also conduct sampling (e.g. following spills) when threats to human health may exist.

Adequate monitoring will be essential to tracking progress, or lack thereof, towards meeting goals and delisting the Clinton River Watershed as an Area of Concern. As recommendations listed in this document are implemented, specific delisting criteria will be developed and the necessary monitoring will need to be implemented.

In 1990 the W.K. Kellogg Foundation provided funding to the Clinton River Watershed Council to develop the Clinton River Watershed Volunteer Monitoring Program. Now entering its fifth year, the program has involved volunteers from over a dozen schools. Students choose sites, evaluate land use, analyze water samples, inventory the macroinvertebrate community, and then synthesize these data into an evaluation of the site. This program provides not only a valuable educational experience, but also useful information. In spite of potential quality control problems, these data are often the first indication of water quality problems.

Proposed Clinton River Watershed Database and Monitoring System

All three work groups for the RAP identified the need for a comprehensive, user friendly, easily accessible database system, which would include at a minimum, data on water and sediment quality, natural habitat and biological communities, and land use. The work groups also expressed a desire to have this database be available locally, so that local planners and managers would be able to utilize it in their decision making.

"Implementation of Biomonitoring in a Watershed Context" is a demonstration project designed to integrate meaningful biomonitoring techniques that are also relatively easy and inexpensive to perform, into Clinton River Watershed monitoring. Many of these techniques have been developed by scientists from around the world, and some have been piloted in the Clinton River Watershed.

Scientists from Oakland University, with funding from the National Science Foundation, held a two day workshop in July 1995 at which scientists described and demonstrated many of these techniques to watershed managers from the Macomb County Health Department, MDPH, MDNR (MDEQ) and other agencies involved in environmental monitoring and management. These techniques will be outlined in a manual to be published in late 1995.

Oakland University has accepted this challenge, and is working to develop a GIS database that will include the variables requested by the RAP work groups, and more. In addition, the University hopes to incorporate regular monitoring of the Clinton River Watershed into this program. Working with a grant from the MDEQ AOC Program, researchers at the University are designing a database and monitoring program that seeks the participation of the diverse stakeholders affected by the problems and the solutions. Through such advisory bodies as the Public Advisory Council of the Clinton River Watershed Remedial Action Plan, the opinions of well informed citizens will help to ensure that the strategies adopted conform to well founded definitions of the problems being addressed and the solutions being adopted. Many tools have been developed which allow the exploration of particular facets of environmental systems by expert participants. Few have been developed to support the learnings of community stakeholders whose economic, political, and social partnerships importantly impact program outcomes. The data

gathering, organizing and modeling activities associated with this project will provide a foundation on which citizen understanding of the Clinton River Watershed, its problems and its promises can grow.

The proposed project will develop tools for the exploration and integration of information on water, watersheds, and human interaction with them. The focus of the project is broad stakeholder understanding of basic principles, and broad stakeholder access to information. In essence, what are the user models of the watershed and its important components, how do their models relate to the decisions with which they are faced, and how can communications be structured to provide a balanced understanding of the information which they must have to contribute to the decision making processes? The key product will be an interactive multimedia/multivariate model of human/environmental interaction which captures the ways in which landscape structure, land use patterns and ecosystem processes impact water quantity and water quality and thus the populations and communities of organisms which depend upon them.

More specifically, the project will develop a multimedia CD-ROM which explains ecosystem processes like the hydrologic cycle, climate, and the impacts of water characteristics on biological systems both as general ideas and as those general ideas apply to the Clinton River Watershed. Similarly, critical

features of landscape structure and topology such as landforms, rivers, streams, wetlands, forests, lakes and ponds will be set forth in general terms and in the specifics of this watershed. Finally, agricultural, residential, commercial, industrial and biological land use patterns, their scale, their requirements and their discharges will be made evident in general terms, as they have developed historically in the Clinton River Watershed and as they exist now. In the context so developed, managerial issues such as landuse, stormwater control, permitting, wetland protection and restoration, solid waste planning, hazardous material management, contaminated sediment management, and community right-to-know programs will be explored in decision support scenarios (Hough, 1995).

Funding for the next stages of the project is being actively sought.

Recommendations

- Develop a user friendly, easily and locally accessible, GIS database containing up-to-date information on sediment and water quality, biota, habitats, and landuse for the Clinton River Watershed.

Oakland University
state and federal agencies
local entities

costs to be determined

- Develop and implement regular, relevant, state-of-the-art monitoring programs that will provide sufficient information to track progress and identify new problems.

all agencies

costs to be determined

- Establish a rigorous biomonitoring program (to accompany chemical monitoring) as outlined by the demonstration project "Implementation of Biomonitoring in a Watershed Context" (see box on previous page).

Oakland University
National Science Foundation
all federal, state and local monitoring/research agencies

costs to be determined

The Macomb County MSU Extension Service has been conducting a very special educational program on water quality. Excursions onboard the *Friendship Clinton* involve classes in a variety of monitoring exercises on the Clinton River. This program has raised awareness of water quality in hundreds of students, and their teachers and parents.

Implementation

The Public Advisory Council has identified as critical, the need for a local institutional structure through which the recommended actions can be initiated, monitored, modified, and if need be, funded. Discussions are proceeding as to exactly what form this will take.

Meanwhile, 84 actions have been identified as necessary to restoring beneficial uses in the Clinton River Watershed. Priority actions are those we feel should be initiated in the next two years, either because of the critical nature of the activity, or the relative ease with which it can be accomplished. PAC and RAP work group members will be pursuing implementation of these activities through a number of venues. Progress on implementation will be reported in the 1997 Update. At that time environmental improvements or backsliding, and modifications to recommended actions will also be noted.

Specific delisting criteria have not yet been developed. Because of the complex nature of many of the beneficial use impairments, we feel it is premature to specify criteria for delisting of the Clinton River Watershed as an Area of Concern. These should also be documented in the 1997 Update.

Recommendations

■ Create the institutional structure to implement recommended actions, and to continue environmental conservation efforts in the watershed into the foreseeable future.

Public Advisory Council

costs to be determined

Summary Table of Recommended Actions

The summary table of recommended actions notes which beneficial use impairments will be addressed by each action, which organizations and agencies have responsibility for implementing each action, a time by which each action should be initiated, and where possible an estimated cost.

Beneficial use impairments correspond to the following numbers in the table:

1. restrictions on wildlife consumption
2. degraded wildlife populations
3. degradation of benthos
4. restrictions on dredging activities
5. eutrophication or undesirable algae
6. beach closings and other "full body contact" restrictions
7. degradation of aesthetics
8. loss of wildlife habitat

| Clinton River Watershed Remedial and Preventive Action Plan Recommended Actions | Beneficial Use Impairments Addressed | | | | | | | | Implementation Responsibility | Time Line | Cost |
|---|--------------------------------------|---|---|---|---|---|---|---|--|------------------|-------------------------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | |
| IND1 Continue monitoring at all facilities | | | • | • | • | | • | | NPDES industries MDEQ/SWQD | ongoing | no additional funding |
| WWT1 More stringent enforcement of Armada IPP | | | • | | | | | | Village of Armada MDEQ IPP Program | ongoing | costs to be determined |
| WWT2 Continue monitoring at all facilities | | | • | • | • | • | • | | NPDES facilities MDEQ/SWQD | ongoing | no additional funding |
| WWT3 All WWTPs undertake pollution prevention for households, etc. | | | • | | | | | | all WWTPs | as feasible | costs to be determined |
| CSO1 Mt. Clemens follow schedule in NOV | | | | | • | • | | | City of Mt. Clemens | ongoing | costs to be determined |
| CSO2 SOCSDS follow new permit requirements | | | | | • | • | • | | Southeast Oakland County Sewage Disposal System | ongoing | costs to be determined |
| CSO3 Evaluate downspout removal program in St. Clair Shores | | | • | • | • | • | • | | Clinton River Public Advisory Council | initiate in 1996 | no special funding required |
| OSD1 Adequately fund septic system study | | | | | • | • | • | | Oakland Co. Health Division Macomb Co. Health Department Clinton River Watershed Council | 1996 and beyond | \$40,000 annually |
| OSD2 Regularly inspect all septic systems | | | | | • | • | • | | All county health departments | as feasible | costs to be determined |
| OSD3 Corrective action for failing septic | | | | | • | • | • | | All county health departments owners of septic systems | initiate by 1997 | costs to be determined |
| OSD4 Alternative technologies to septic systems | | | | | • | • | • | | All county health departments Clinton River Watershed Council SEMCOG | initiate by 1997 | minimal special funding required |
| OSD5 Continue Oakland Co. septic density policy | | | | | • | • | • | | Oakland Co. Health Division | ongoing | minimal special funding required |
| OSD6 Macomb Co. adopt higher septic standards | | | | | • | • | • | | Macomb Co. Health Department Macomb Co. Commission | initiate by 1997 | costs to be determined |
| OSD7 State-wide septage disposal policy | | | | | • | • | • | | local state legislator Statewide Public Adv. Council | as feasible | costs to be determined |

| Clinton River Watershed Remedial and Preventive Action Plan Recommended Actions | Beneficial Use Impairments Addressed | | | | | | | | Implementation Responsibility | Time Line | Cost |
|---|--------------------------------------|---|---|---|---|---|---|---|---|------------------|---------------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | |
| OSD8 Local septage management program | | | | | • | • | • | | All local governments in the Clinton River watershed | as feasible | costs to be determined |
| ILC1 Red Run Drain pollution abatement program | • | • | • | • | • | • | • | • | Macomb and Oakland health depts. Macomb and Oakland DPWs | initiate by 1997 | \$2/yr/household |
| ILC2 Macomb Co. illegal connections program, continue | | | • | • | • | | | | Macomb County government | initiate by 1997 | costs to be determined |
| ILC3 Oakland Co. illegal connections program, initiate | | | • | • | • | | | | Oakland County government | initiate by 1997 | costs to be determined |
| URS1 Local stormwater ordinances | | • | • | | • | • | • | • | All local governments Clinton River Watershed Council | initiate by 1997 | costs to be determined |
| URS2 Watershed stormwater management for drains | | • | • | | • | • | • | • | All county drain commissioners | initiate by 1997 | costs to be determined |
| URS3 Stormwater management education for new development | | • | • | | • | • | • | • | Clinton River Watershed Council MDEQ | initiate by 1997 | \$50,000 |
| URS4 Control bacteria in storm sewers and drains | | | | | | • | | | All county DPWs All county drain commissioners | as feasible | costs to be determined |
| URS5 Identify drain ownership and maintenance responsibility | | • | • | | • | • | • | • | All local governments All drain commissioners Inter-Co. Drainage District | initiate by 1997 | costs to be determined |
| URS6 Building inspectors... BMP inspection training | | • | • | | • | • | • | • | Clinton River Watershed Council LEAs and CEAs | initiate by 1997 | \$30,000 |
| URS7 Public education on buffer strips and other BMPs | | • | • | | • | • | • | • | NRCS, HCMA Cooperative Extension Service | initiate by 1997 | costs to be determined |
| URS8 Map critical slope areas in the watershed | | • | • | | • | • | • | • | SWCD, NRCS Oakland University | initiate by 1997 | costs to be determined |
| URS9 Preserve and create vegetative buffer strips | | • | • | | • | • | • | • | Drain Commissioners, SWCD, NRCS, local planners | initiate by 1997 | costs site specific |
| URS10 Erosion control and no direct discharges at stream crossings | | • | • | | • | • | • | • | County Road Commissions | as feasible | costs to be determined |

| Clinton River Watershed Remedial and Preventive Action Plan Recommended Actions | Beneficial Use Impairments Addressed | | | | | | | | Implementation Responsibility | Time Line | Cost |
|---|--------------------------------------|---|---|---|---|---|---|---|--|------------------|---------------------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | |
| URS11 Uniform soil erosion control program throughout the watershed | | • | • | | • | • | • | • | LEAs and CEAs, CRWC county commissions | initiate by 1997 | costs to be determined |
| URS12 Staging, scheduling of construction; bare soil ordinance and/or incentives | | • | • | | • | • | • | • | LEAs and CEAs county commissions | initiate by 1997 | little special funding required |
| URS13 Study impacts of road de-icing; consider alternatives | | | • | | | | | | County Road Commissions Michigan Dept. of Transportation | as feasible | costs to be determined |
| URS14 Redirect 20% of co. rd. commission budgets to SWCDs for erosion control | | • | • | | • | • | • | • | County Road Commissions | as feasible | redirect current funding |
| URS15 Make NRCS and drainage districts eligible for SRF and WW construction funding | | • | • | | • | • | • | • | Assoc. Co. Drain Comm., Assoc. Cons. Dist., state leg. | as feasible | no special funding required |
| AGS1 Seek additional funding for technical assistance to landowners re: erosion | | • | • | | • | • | • | • | Natural Resources Cons. Service Clinton River Watershed Council | initiate by 1997 | \$60,000 annually |
| AGS2 Develop cost share program for erosion control with SRF | | • | • | | • | • | • | • | Michigan Department of Agriculture | as feasible | costs to be determined |
| AGS3 Allocate 0.01 mil of local property taxes to fund NRCS and erosion programs | | • | • | | • | • | • | • | County Boards of Commission | initiate by 1997 | reallocation of current funds |
| AGS4 Education to prevent feeding of wildlife | | | • | | • | • | | | Huron-Clinton Metro. Authority Clinton River Watershed Council | expand by 1997 | costs minimal |
| AGS5 Enact local ordinances to ban wildlife feeding | | | • | | • | • | | | Local governments | as feasible | no special funding required |
| AGS6 Monitor and correct animal waste problems on the Clinton River | | | • | | • | • | | • | MDA, NRCS, SWCD County Health Departments | expand by 1997 | costs to be determined |
| AGS7 Help livestock producers develop and implement manure management plans | | | • | | • | • | | • | NRCS, SWCD Cooperative Extension Service | expand by 1997 | costs to be determined |
| AGS8 Coordinate the annual work plans of the 4 CDs in the watershed | | • | • | | • | • | • | • | Michigan Department of Agriculture | initiate by 1997 | no special funding required |
| AGS9 Seek assistance and funding from MDEQ for 319 funding, and other sources | | • | • | | • | • | • | • | Natural Resources Cons. Service Local governments | 1996 and beyond | no special funding required |

| Clinton River Watershed Remedial and Preventive Action Plan Recommended Actions | Beneficial Use Impairments Addressed | | | | | | | | Implementation Responsibility | Time Line | Cost |
|---|--------------------------------------|---|---|---|---|---|---|---|---|------------------|------------------------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | |
| AGS10 Identify and prioritize joint efforts on uplands and drains | | • | • | | • | • | • | • | Natural Resources Cons. Service Drain Commissioners | initiate by 1997 | no special funding required |
| HAB1 Assess information, complete inventory, ID important natural features; database | | • | • | | | | • | • | MDNR, county & local govts., HCMA, SEMCOG, CRWC, Oakland University | initiate by 1997 | costs to be determined |
| HAB2 Incorporate habitat protection into local land use planning and zoning | | • | • | | | | • | • | local governments Clinton River Watershed Council | initiate by 1997 | little special funding required |
| HAB3 Evaluate and prioritize sites for habitat improvements | | • | • | | | | • | • | PAC, RAP group, Trout Unlmted., MDNR, MDEQ, CRWC, local govts. | initiate by 1997 | little special funding required |
| HAB4 Acquire, restore and protect conservation lands | | • | • | | | | • | • | land conservancies, HCMA, local governments, co. parks | initiate by 1997 | costs to be determined |
| HAB5 Complete Clinton River Watershed fisheries assessment | | • | | | | | | • | MDNR, Fisheries Division | initiate by 2000 | funding tied to scheduling |
| HAB6 Restore in-stream habitat for sustainable fish communities | | • | | | | | | • | Trout Unlimited, local govts., MDNR, land conservancies | expand by 1997 | costs site specific; TBD |
| HAB7 Enhance public awareness and local stewardship efforts | | • | • | | | | • | • | County Extension Service HCMA, CRWC | expand by 1997 | costs to be determined |
| HAB8 Restore fish migration ability and spawning habitat/dams and lake level controls | | • | | | | | | • | local governments MDNR, MDEQ | as feasible | costs to be determined |
| HYD1 Protect functions of wetlands and floodplains/eliminate isolation practices | | • | | | | | | • | local governments MDEQ | initiate by 1997 | little special funding required |
| HYD2 Protect headwaters from channelization; incorporate flow patterns into drain design... | | • | • | | | | • | • | County Drain Commissioners | initiate by 1997 | little special funding required |
| HYD3 Restore recruitment of woody debris | | • | • | | | | | • | local governments County Parks Departments, CRWC | initiate by 1997 | little special funding required |
| HYD4 ID important groundwater recharge areas; develop protection strategy | | • | • | | | | | • | local governments | initiate by 1997 | costs to be determined |
| HYD5 Establish hydrological model of the Clinton River...establish base flows... | | • | • | | | | • | • | USGS, drain commissioners, Oakland Univ., USACOE, MDEQ | as feasible | costs to be determined |

| Clinton River Watershed Remedial and Preventive Action Plan Recommended Actions | Beneficial Use Impairments Addressed | | | | | | | | Implementation Responsibility | Time Line | Cost |
|--|--------------------------------------|---|---|---|---|---|---|---|---|------------------|------------------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | |
| HYD6 Determine measures to achieve base flow | | • | • | | | | | • | USGS, USACOE, MDEQ Drain Commissioners | as feasible | costs to be determined |
| HYD7 Restore summer base flows; further evaluate best method(s) | | • | • | | | | | • | Drain Commissioners, local govts. MDEQ | as feasible | costs depend upon method(s) |
| HYD8 Develop hydrological watershed plan | | • | • | | | | | • | local governments, PAC, CRWC drain commissioners, MDEQ | as feasible | costs to be determined |
| HYD9 Develop basin-wide log and debris jam master plan | | • | • | | | | | • | Clinton River Watershed Council | as feasible | costs to be determined |
| SED1 Complete assessment; make remedial decisions | • | | • | • | • | | | | USEPA, MDEQ, USACOE PRPs as identified | 1996-1998 | \$150,000/yr for three years |
| SED2 Approach potentially responsible parties for help with assessment and clean-up | • | | • | • | • | | | | USEPA, MDEQ Public Advisory Council | as identified | no special funding required |
| SED3 Control sources of contaminants | • | | • | • | • | | | | Responsible parties MDEQ, local governments | by 1998 | costs site specific |
| SED4 Implement remedial measures as necessary | • | | • | • | • | | | | Responsible parties | initiate by 2000 | costs to be determined |
| CST1 Include in a publicly accessible database all identified contaminated sites in the basin | | | • | • | | | | | Oakland University MDEQ | initiate by 1997 | costs to be determined |
| CST2 Identify and track progress at contaminated sites | | | • | • | | | | | state & county health depts. PAC, MDEQ | as feasible | costs to be determined |
| CST3 Evaluate effects of contaminated sites on groundwater and surface water | | | • | • | | | | | County Health Departments | as feasible | costs to be determined |
| LAN1 Sample discharges from suspect facilities; counties should include regular sampling in solid waste mngmt. plans | | | • | • | | | | | county governments MDEQ, Waste Management Division | initiate by 1997 | costs to be determined |
| LAN2 Inspect inactive landfills | | | • | • | | | | | MDEQ, Waste Mngmt. Division | initiate by 1997 | costs to be determined |
| LAN3 Correct problems at facilities | | | • | • | | | | | County governments MDEQ, Waste Mngmt. Division | initiate by 1997 | costs site specific |

| Clinton River Watershed Remedial and Preventive Action Plan Recommended Actions | Beneficial Use Impairments Addressed | | | | | | | | Implementation Responsibility | Time Line | Cost |
|---|--------------------------------------|---|---|---|---|---|---|---|---|------------------------------------|---------------------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | |
| LAN4 Educate owners and operators of junk yards about pollution prevention | | | • | • | | | | | County Extension Service | as feasible | costs to be determined |
| LAN5 Obtain enhanced regulatory control over junk yard facilities | | | • | • | | | | | local state legislators | as feasible | little special funding required |
| HHW1 Evaluate existing HHW programs and facilities; determine needs | | | • | • | • | | • | | County Extension Service, CRWC County Planning Departments | complete in 1996 | little special funding required |
| HHW2 Educate residents about pollution prevention | | | • | • | • | | • | | County Extension Service, SMDA, local govts., SOCRRRA | as feasible | costs to be determined |
| HHW3 Provide collection, recycling and disposal services where lacking | | | • | • | • | | • | | local governments county governments | as feasible | costs to be determined |
| HHW4 Expand storm drain stenciling program | | | • | • | • | | • | | Clinton River Watershed Council | as feasible | little special funding required |
| HHW5 Incorporate pollution prevention/HHW into school curricula | | | • | • | • | | • | | County Extension Service, CRWC local school systems | as feasible | costs to be determined |
| AIR1 Determine & quantify pollutants contributing to use impairments | ? | | ? | ? | ? | | | | To be determined | as mechanism becomes available | costs to be determined |
| AIR2 Quantify air emissions originating in the Clinton River watershed | ? | | ? | ? | ? | | | | MDEQ, Air Quality Division | when RAPIDS database comes on line | no special funding required |
| AIR3 Monitor new technologies for determining effects of atmospheric emissions/deposition | ? | | ? | ? | ? | | | | Public Advisory Council MDEQ | initiate in 1995 | no special funding required |
| MON1 Develop & maintain GIS multi-variable database | • | • | • | • | • | • | • | • | Oakland University local, state, federal agencies | ongoing | costs to be determined |
| MON2 Implement regular monitoring programs to track progress & ID new problems | • | • | • | • | • | • | • | • | Oakland University all agencies | initiate by 1997 | costs to be determined |
| MON3 Establish a rigorous biomonitoring program | • | • | • | • | • | • | • | • | National Science Foundation Oakland Univ., all agencies | initiate by 1997 | costs to be determined |
| IMP1 Create institutional structure to implement plans and continue conservation efforts | • | • | • | • | • | • | • | • | Public Advisory Council | initiate in 1995 | costs to be determined |

Appendix A. References

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Appendix B. Clinton River Basin NPDES Permitted Facilities

The following is an MDEQ description of NPDES permitted facilities which discharge to the Clinton River Watershed, status as of August 1994. The description includes the facility name, NPDES permit number, permit issuance and expiration date, and a brief summary of permit requirement, permit compliance, and treatment system. Many permits have been up for renewal since this was compiled, compliance status may change, and new data becomes available on a monthly basis.

Almont WWTP (MI0020931) 05/21/92 - 10/01/96 The facility is a wastewater treatment plant in the Village of Almont with a design flow of 0.47 MGD, although the actual flow in 1994 0.37. Discharge is to the North Branch of the Clinton River. Treatment is tertiary with sand filters, oxidation ditches, aerobically digested sludge and UV disinfection. The facility is well within all permit limits and in compliance. However a July 1994 toxicity test indicated that the effluent was chronically toxic to Ceriodaphnia. This will be considered during permit reissuance. The village has separate storm and sanitary sewers.

Amoco Oil Co - Mt Clemens (MI0050474) 12/19/91 - 10/01/96 The facility is a gasoline station located at 44975 Gratiot Avenue in Mount Clemens. The site has groundwater contaminated with gasoline from leaking tanks and lines. It is a Leaking Underground Storage Tank (LUST) remediation site. As such, it has an NPDES permit to discharge a maximum of 7,200 gallons per day of treated groundwater through outfall 001 to the Clinton River via storm drains.

Treatment of the groundwater is provided by a two stage activated carbon system. The permit requires the Company to monitor the influent to the system, the effluent of the first stage carbon and the final effluent. The final effluent is limited for BTEX (20 ug/l), Benzene (5 ug/l), Lead (10 ug/l), pH (6.5 to 9) and Phosphorus (1 mg/l). The permittee is also required to monitor daily flow, to inspect the treatment system three times a week and to visually observe the effluent once each week.

Amoco Oil Co - Warren (MI0050482) 01/16/92 - 10/01/96 The facility is a gasoline station located at 27848 Van Dyke in Warren. The site has groundwater contaminated with gasoline from leaking tanks and lines. It is a Leaking Underground Storage Tank (LUST) remediation site. As such, it has an NPDES permit to discharge a maximum of 7,200 gallons per day of treated groundwater through outfall 001 to Bear Creek via storm sewers.

Treatment of the groundwater is provided by a two stage activated carbon system. The permit requires the monitoring of the influent to the system, the effluent from the first carbon stage and the final effluent. The final effluent is limited for BTEX (20 ug/l), Benzene (5 ug/l) and pH (6.5 to 9). The permittee is also required to monitor daily flow, to inspect the treatment system three times a week and to visually observe the effluent once each week.

Armada WWTP (MI0022225) 07/18/91 - 10/01/95 The facility is a publicly owned, secondary sewage treatment plant with phosphorus removal. The facility uses a fill and draw activated sludge system known as a Sequencing Batch Reactor (SBR) which was completed in 1989. It was designed to treat an average flow of 0.6 MGD and has a hydraulic capacity of 1.5 MGD to handle peak flows. The facility was recently issued a Notice of Violation for failing to comply with permit requirements; the NOV requires the facility to develop an industrial pretreatment program (IPP). The facility completed the separation of the sanitary sewer system in August, 1993.

The wastewater goes through a mechanical bar screen then flows to a vortex-type grit tank and then is lifted up with a lift station into the SBR units. From the SBR tank the effluent is passed through an ultraviolet disinfection unit and is discharged to the East Branch of Coon Creek via outfall 001.

Based on their Discharge Monitoring Report from January 1992 to present, the facility had the following violations of NPDES permit limits: TSS (Feb. 92, Jan. 93, Oct. 93); NH₃-N (Aug. 92, May 93, Aug. 93, Nov. 93); T-PO₄ (Sep. 92, Oct. 92, Jun. 93, Aug. 93, Sep. 93); D.O. (Mar. 92, Apr. 92, Jun. 92, Jul. 92, Aug. 92, Sep. 92); pH (Oct. 93).

Borg-Warner Automotive, Inc. (MI0004774) 12/12/90 - 10/01/95 The facility is located at 6700 18 1/2 Mile Road, Sterling Heights. The permittee is authorized to discharge an unspecified amount of storm water runoff and groundwater seepage from a storm water retention pond, through outfall 001 to Plum Brook. The permittee is required to visually observe the effluent and to retain self-monitoring records. No permit violations or spills have been reported.

C. S. Ohm Manufacturing Company (MI0038628) 10/18/90-10/01/95 The facility is located at 6640 Sterling Drive South, Sterling Heights. The permittee is authorized to discharge a maximum of 0.3 MGD of noncontact cooling water and storm water runoff from outfall 001 to Big Beaver Creek. The permittee is required to monitor flow, temperature, pH (6.5-9.0), and observe the outfall. No recent permit violations or spills have been reported.

Carboloy Inc. (MI0004260) 05/21/87 - 10/01/90 The facility is located at 11177 East Eight Mile Road, Warren. The facility manufactures cemented tungsten carbide components and cutting tools. The permittee is authorized to discharge 0.1 MGD of noncontact cooling water and storm water runoff from outfall 002 to Red Run via Bear Creek and storm sewer. The permittee is required to retain self-monitoring reports for visual outfall observation and flow. No permit violations or spills have been reported.

Chrysler Dodge City Complex (MI0048968) 11/21/91 - 10/01/95 The facility is located at 21500 Mound Road, Warren. The permittee is authorized to discharge 0.16656 MGD of noncontact cooling water, 0.01685 groundwater seepage, and storm water runoff through outfall 001 to Bear Creek. The permittee is also authorized to discharge 0.015 MGD of noncontact cooling water, 0.01054 MGD of boiler blowdown, 0.03691 MGD of groundwater seepage and stormwater runoff through outfall 002 to Red Run Drain. Recently, the permittee rerouted all the boiler blowdown to the Warren WWTP and requested a permit modification. The permittee is required to monitor flow, temperature, TSS, pH, and outfall observation. Their process wastewater and floor drains discharge to their wastewater pretreatment system. The effluent is discharged to the City of Detroit Sanitary Sewer System. The Company has an industrial pretreatment permit from Detroit WWTP.

Since January 1991, the Company had one diesel fuel spill (04/10/91) which was cleaned up properly and did not appear to impact the surface water. The Company has been in compliance with their permit limits.

Chrysler Sterling Heights (MI0000345) 02/21/91 - 10/01/95 The facility is an automotive assembly plant located at 38111 Van Dyke Road in Sterling Heights. The permit authorizes the discharge of an unspecified amount of storm water (including coal pile runoff) at a rate of 5 million gallons per day from a storm water retention basin through outfall 001 to Moore Drain.

The effluent is to be monitored daily during discharge. It is limited for total suspended solids (20 mg/l average and 30 mg/l maximum) and PH (6.5 to 9). The flow is to be monitored and the effluent visually observed.

The permit requires the Company to perform special short term monitoring of the final effluent (001) and the coal pile runoff. They are to be analyzed for heavy metals once each month for three months.

Chrysler Sterling Stamping (MI0047619) 10/18/90 - 10/01/95 The facility is located at 35777 Van Dyke, Sterling Heights. The Company produces automotive parts stamped from sheet steel. The permittee is authorized to discharge unspecified amount of stormwater from outfalls 002, 003, 004, and 005 to Red Run Drain via Sterling Relief Drain. The permittee is required to monitor oil and grease and visually observe the outfall. The Company has a spill pollution control and counter-measure plan for oil pollution prevention. No recent permit violations or spills have been reported.

Ford - Michigan Proving Grounds (MI0003425) 11/22/82-06/30/87 The facility is an automotive testing area located at 4305 Mack Road in Romeo. The permittee is authorized to discharge treated domestic wastewater, garage floor drainage and carwash water to East Pond Creek via outfall 001. The permit also limits the discharge of air conditioning cooling water and storm water discharged to the Creek via outfall 004.

Ford - Romeo Engine Plant (MI0045179) 09/19/91 - 10/01/95 The facility is a truck engine manufacturing plant located at 701 East 32 Mile Road in Romeo. The permit authorizes the discharge of 3000 gallons per day of noncontact cooling water and an unspecified amount of storm water runoff from outfall 003 to East Pond Creek via a storm pond.

The company is required to visually inspect and measure the flow of the discharge once each week. They are to record their findings and retain the record on site.

Ford - Sterling Plant (MI0003417) 10/18/90 - 10/01/95 The facility is located at 39000 Mound Road, Sterling Heights. The permittee is authorized to discharge 0.4 MGD of noncontact cooling water and stormwater runoff from a storm pond through outfall 001 to Plum Brook, a tributary to the Clinton River, via Moore Drain. The permittee is required to monitor flow, oil and grease, and observe the outfall.

Ford - Utica Trim Plant (MI0003441) 05/19/88 - 10/01/90 The facility is located at 50500 Mound Road, Utica. The permittee is authorized to discharge 0.036 MGD of noncontact cooling water and stormwater runoff to the Old Clinton Channel. The permittee is required to monitor flow, temperature, pH, and observe the outfall.

On January 7-14, 1994, MDEQ staff conducted a chronic toxicity evaluation on grab samples of the Plants outfall 001 effluent. The effluent was not acutely or chronically toxic to fathead minnows or *Ceriodaphnia*, indicating that the effluent was meeting the aquatic toxicity-related requirements of Rules 57 and 82 of the Michigan Water Quality Standards. However, the effluent contained measurable quantities of cadmium (0.3 ug/l), chromium (1.6 ug/l), copper (4.6 ug/l), nickel (3.2 ug/l), and zinc (40 ug/l).

Forest City - 1 Hour Martinizing (MI0052361) 03/18/93 - 10/01/97 The facility is located at 30785 Gratiot Avenue, Roseville. The permittee is authorized to discharge 0.0432 MGD of treated groundwater through outfall 001 to an unnamed tributary to the Clinton River Spillway. The permittee is required to monitor BETX, benzene, tetrachloroethene, trichloroethene, 1,1-dichloroethene, c+t-1,2-dichloroethene, pH, and observe the outfall. The effluent is treated with two-stage activated carbon treatment system. The Company has been in compliance with their permit limits.

GM-Technical Center - Warren (MI0043931) 12/26/84 - 11/30/89 The Company had a spill of water containing a 15% additive mixture (mixture of denatured alcohol, ethylene glycol, silicon defoamer, and silver nitrate) from a "chilled water" pipe on April 9, 1993. Small amount of the material went to Bear Creek. Most of the spilled material was cleaned up with a vacuum truck.

Hubbard Mini Mart (MI0051098) 05/21/92 - 10/01/96 The facility is a gasoline station/market located at 30158 South River Road in Mount Clemens. The site has groundwater contaminated with gasoline from leaking tanks and lines. It is a Leaking Underground Storage Tank (LUST) remediation site. As such, it has an NPDES permit to discharge a maximum of 7,200 gallons per day of treated groundwater through outfall 001 to the Clinton River via storm sewers.

Treatment of the groundwater is provided by a two stage activated carbon system. The permit requires the Company to monitor the influent to the system, the effluent of the first stage carbon and the final effluent. The final effluent is limited for BTEX (20 ug/l), Benzene (5 ug/l) and pH (6.5 to 9). The permittee is also required to monitor daily flow, to inspect the treatment system three times a week and to visually observe the effluent once each week.

JJJ Inc. (MI0047163) 03/28/91 - 10/01/95 The company is located at 34401 Commerce Road, Fraser. The company does stamping and metal plating of auto parts. The company is authorized to discharge 0.056 MGD of noncontact cooling water from outfall 001 to Sweeny Drain. The final effluent is limited for pH (6.5 - 9.0), total lead (11 ug/l as monthly average). The permittee is also required to monitor flow, amenable cyanide, chloroform, temperature, and observe the outfall. No recent permit violations or spills have been reported.

Lakehead Pipe Line Co. - Romeo (MI0048526) 06/13/90-10/01/94 Storm water runoff from a land farming operation which is being used to remediate soil contaminated from a crude oil spill.

Masco Industries-Molloy MFG Co. (MI0041696) 03/28/91-10/01/95 The Company is located at 18450 15 Mile Road, Fraser. The permittee is authorized to discharge 0.25 MGD of noncontact cooling water and stormwater runoff from outfall 002 to Tesk Drain. The permittee is required to monitor flow, temperature, oil and grease, pH, and outfall observation.

Mobil Oil Corp. - Mt Clemens (MI0050539) 01/16/92 - 10/01/96 The facility is a gasoline station located at 37137 Harper Avenue in Mount Clemens. The site has groundwater contaminated with gasoline from leaking tanks and lines. It is a Leaking Underground Storage Tank (LUST) remediation site. As such, it has an NPDES permit to discharge a maximum of 7,200 gallons per day of treated groundwater through outfall 001 to the Clinton River Spillway via storm sewers.

Treatment of the groundwater is provided by a two stage activated carbon system. The permit requires the Company to monitor the influent to the system, the effluent of the first stage carbon and the final effluent. The final effluent is limited for BTEX (20 ug/l), Benzene (5 ug/l) and pH (6.5 to 9). The permittee is also required to monitor daily flow, to inspect the treatment system three times a week and to visually observe the effluent once each week.

Mobil Oil Corp. - Shelby Twp (MI0050679) 01/16/92 - 10/01/96 The facility is a gasoline station located at 51026 Van Dyke Road in Shelby Township. It is a LUST remediation site with permit limitations and monitoring requirements identical to those discussed above. The treatment unit is a three stage granulated carbon system. Discharge is through outfalls 001 and 002 to Decker Drain via storm sewers.

Mobil Oil Corp. - Sterling Hts I (MI0050547) 01/16/92-10/01/96 The facility is a gasoline station located at 40920 Mound Road in Sterling Heights. It is a LUST remediation site with a treatment system and permit limitations and monitoring requirements identical to those discussed above. Discharge is to Plum Brook via storm sewers.

Mobil Oil Corp. - Warren (MI0050571) 01/16/92 - 10/01/96 The facility is a gasoline station located at 11550 Thirteen Mile Road in Warren. It is a LUST remediation site with a treatment system and permit limitations and monitoring requirements identical to those discussed above. Discharge is to Red Run Drain via storm sewers.

Mobil Oil Corp.-Warren II (MI0051039) 03/19/92 - 10/01/96 The facility is a gasoline station located at 3909 Twelve Mile Road in Warren. It is a LUST remediation site with a treatment system and permit limitations and monitoring requirements identical to those discussed above. Discharge is to Red Run Drain via storm sewers.

Mt Clemens WFP (MI0005193) 06/21/90 - 10/01/94 The facility is the treatment plant for the potable water supply wells for the City of Mt. Clemens. The permit allows the discharge of filter backwash to the Clinton River.

Mt Clemens WWTP (MI0023647) 09/22/89 - 01/01/95 The Mt. Clemens Wastewater Treatment Plant has an average design flow of 6.0 MGD. Treatment processes include: bar screens, grit removal, a three-channel orbital oxidation ditch, two final clarifiers, sand filtration, chlorine disinfection followed by sulfur dioxide dechlorination, and cascade aeration prior to discharge to the Clinton River through outfall 001.

The plant design capacity is based on the sand filtration capacity of 6 MGD. The excess flow can be routed from the facility's final clarifiers directly to a chlorination unit with sulfur dioxide dechlorination and subsequently discharged to the Clinton River via outfall 002.

Influent flows in excess of the plant's capacity are routed to a 30 million gallon retention/treatment basin. When the basin is full and influent to the plant exceeds design treatment capacity, wastewaters may be discharged from the basin to the Clinton River via outfall 003 after chlorination disinfection.

Based on their Discharge Monitoring Report from January 1992 to present, the facility had the following violations of NPDES permit limits: amenable cyanide (Jan. 92, Mar. 92, May 92, Aug. 92, Oct. 92, Dec. 92, Jan. 93, Feb. 93, Mar. 93, Aug. 93); total cadmium (Feb. 92, Mar. 92); hexavalent chromium (Feb. 92); silver (Apr. 93)

The City conducted a source identification study for amenable cyanide on December, 1992. The City could not identify any particular source. The City modified the sampling location for amenable cyanide from prior to the chlorination to after the chlorination on September, 1993, and regulated truck hauled material for cyanide. Since September 1993, the City has been in compliance with the permit limits.

Pepsi-Cola Metro Bottling Group (MI0990154) 04/22/94 - The permittee is authorized to discharge 0.072 MGD of activated carbon treated groundwater from a facility located at the Pontiac Warehouse, 960 Featherstone Road, Pontiac, to the Clinton River via storm sewers.

Romeo WWTP (MI0021679) 05/23/91 - 10/01/95 The Romeo WWTP has a design flow of 1.6 MGD. Treatment processes include: a bar screen and comminuter, an aerated grit chamber, primary clarifiers, rotating biological contact discs, secondary clarifiers, pressure sand filters, chlorine disinfection followed by sodium sulfide dechlorination and reaeration prior to discharge to East Pond Creek through outfall 001. East Pond Creek is a designated trout stream; as such plant permit limits are very stringent. The system consists of separate sewers and there are no sanitary overflows or combined sewer overflows.

Based on their DMR from Jan. 92 to present, the facility has been in compliance with the permit limits except one TRC (Jan. 93) violation.

TRW Vehicle Safety Sys. Div. (MI0000621) 12/13/90 - 10/01/95 The facility is located at 61166 Van Dyke Road, Washington. The facility is authorized to discharge 0.15 MGD of noncontact cooling water and stormwater runoff to Yates Drain, tributary to the Middle Branch Clinton River, via Taft Drain. The permittee is required to retain self-monitoring requirements for flow, temperature, and outfall observation.

US Army-Tank Auto Command (MI0041661) 07/18/91 - 10/01/95 The facility is located at 6501 East 11 Mile Road, Warren. The facility is authorized to discharge 0.01 and 0.1 MGD of noncontact cooling water and stormwater runoff from outfall 001 and 002, respectively to Bear Creek via storm sewers. The permittee is required to retain self-monitoring reports for flow and outfall observation.

Warren WWTP (MI0024295) 09/22/89 - 01/01/95 The facility is a publicly owned tertiary sewage treatment plant with a design capacity of 36 MGD that serves the City of Warren. The plant is located at 32360 Warkop in Warren. The City has a separated collection system with two main interceptors and one remote lift station. About 38% of the plant inflow is nondomestic wastewater. The City has an approved and fully implemented Industrial Pretreatment Program.

Incoming wastewater flows through a bar screen. The screened wastewater is pumped up to the grit chambers. Grit is removed in three chambers operated in parallel. During normal operation, two of the chambers are used, the third discharges to a 50 million gallon retention basin and is used only during high flow periods.

Primary clarification is performed in eight rectangular settling tanks. tank motors and shafts operate in pairs with individual drive chains, secondary treatment and nitrification is accomplished by the single stage activated sludge process in six aeration tanks. Two of the tanks are maintained for stand-by operation. Ferrous chloride is added to the discharge from the aeration tanks for phosphorus removal. A polymer may also be added at this point. Secondary clarification is performed in eight circular settling tanks. Tertiary treatment is provided by twelve high rate, mixed media filters. Tertiary effluent is disinfected with chlorine and discharged to the Red Run through outfall 001.

The final effluent is limited for CBOD, total suspended solids, ammonia nitrogen, total phosphorus, dissolved oxygen, fecal coliform bacteria, pH and total residual chlorine. The permit also requires quarterly monitoring of the effluent for mercury, cyanide, tetrachloroethane, trans 1,3-dichloropropene and 1,2-dichlorobenzene.

Based on their Discharge Monitoring Report from January 1992 to present, the facility had been in compliance with their permit limits.

Amoco Oil Co - Madison Heights (MI0049620) 07/18/91-10/01/95 The facility is located at 25005 Dequindre, Madison Heights. The facility is authorized to discharge 0.0072 MGD of treated groundwater through outfall 001 to Red Run via a storm sewer. The permittee is required to monitor and limit for flow, BETX, benzene, methyl tert-butyl ether, pH, equipment inspection, and outfall observation. Gasoline contaminated groundwater is treated with two-stage activated carbon treatment system. The Company has been in compliance with their permit requirements.

Amoco Oil Co - Madison HTS II (MI0050466) 12/19/91 - 10/01/96 The facility is a gasoline station located at 26737 Dequindre in Madison Heights. It is a LUST remediation site with treatment system and permit limitations and monitoring requirements similar to those discussed above. Discharge is to the Red Run Drain via storm sewers.

Austin-Clarkston-Ortonville Rd (MI0051411) 09/17/92-10/01/96 The facility is a Shell gasoline station located at 1751 Ortonville Road in Clarkston. It is a LUST remediation site with treatment system and permit limitations and monitoring requirements similar to those discussed above. Discharge is to the Clinton River via storm sewers.

Big Beaver Specialty Co. (MI0038741) 12/13/90 - 10/01/95 The facility is located at 1659 Rochester Road, Troy. The facility is authorized to discharge 0.0005 MGD of noncontact cooling water and stormwater runoff through outfall 001 to Spencer Drain via storm sewers. The permittee is required to retain self-monitoring reports for flow and outfall observation.

Buckeye Pipeline Co (MI0041700) 06/30/80 - 03/31/85 The facility is located at U.S. 10 and I-75, Section 19, Independence Township, Oakland County. The facility is authorized to discharge treated groundwater to a tributary of Deer Lake via an unnamed creek. On July 31, 1992, the Company requested termination of their NPDES permit. Their request is under review by MDEQ.

Chrysler Technology Center (MI0045586) 05/21/87 04/30/92 The facility is located at Featherstone and Squirrel Roads, Auburn Hills. The permittee operates an automotive research and development facility which is still under construction. The facility is authorized to discharge unspecified amount of stormwater from outfall 001, 002, 003, and 004 to Galloway Creek. The final effluent is limited for total suspended solids (25 mg/l as monthly average, 45 mg/l as daily maximum), oil and grease (10 mg/l as daily maximum). The permittee is also required to monitor daily flow and visual outfall observation.

On May 27, 1994, the draft permit was public noticed for reissuance. The draft permit included the following modifications to the current permit: adding monitoring requirements for lead, zinc, and phosphorus at outfalls 001 and 003 and monitoring requirements for lead and zinc at outfall 002; removing the limits for total suspended solids and oil and grease; adding a new outfall 005; requiring a storm water pollution prevention plan as a special condition.

Delta Tooling Co. (MI0046523) 07/18/91 - 10/01/95 The facility is located at 1350 and 1400 Harmon Road, Auburn Hills. The facility is authorized to discharge 0.6048 and 0.66816 MGD of noncontact cooling water and stormwater runoff from outfalls 001 and 002, respectively, to Galloway Creek via Vinewood Drain via storm sewers. The permittee is required to retain self-monitoring reports for flow, temperature, PH, and outfall observation.

Eaton-Troy-Maplelawn (MI0052167) 02/18/93 - 10/01/97 The facility is located at 1728 Maplelawn Road, Troy. The site has groundwater contaminated with organic chemicals. The facility is authorized to discharge 0.003 MGD of treated groundwater from outfall 001 to Red Run via storm sewers. The contaminated groundwater is treated by air stripping. The final effluent is limited for total 1,2-dichloroethene (5 ug/l), vinyl chloride (3 ug/l), and 1,1-dichloroethene (2 ug/l). The permittee is also required to monitor the influent for total 1,2-dichloroethene and flow, to inspect the treatment system three times a week and to visually observe the effluent once each week.

Emro Marketing Co-Auburn Hills (MI0049107) 04/04/91-10/01/95 The facility is a Speedway gasoline station located at 2100 University Drive in Auburn Hills. It is a LUST remediation site with treatment system and permit limitations and monitoring requirements similar to those discussed above. Discharge is to Galloway Creek.

G P Plastic Inc. (MI0044822) 07/18/91 - 10/01/95 The facility is located at 3910 Industrial Drive, Rochester Hills. The facility is authorized to discharge 0.0048 MGD of plastic parts rinse water from outfall 001 to an unnamed pond north of the facility. The effluent is monitored and limited for flow, BOD-5, oil and grease, total suspended solids, total phosphorus, outfall observation, temperature, dissolved oxygen, and pH. The facility has been in noncompliance with the NPDES permit limits for BOD-5 and oil and grease for several months. The Company requested the termination of their permit on April 14, 1994. This termination request is under review by MDEQ. Currently, the Company is collecting their wastewater in a holding tank. The wastewater is hauled to a disposal firm by a contractor once a week.

GM-CPC-Pontiac (MI0042412) 05/19/88 - 10/01/90 The facility is located at One Pontiac Plaza, Pontiac. The facility is authorized to discharge 0.345 MGD of drinking fountain overflow, groundwater seepage and an unspecified amount of stormwater runoff from outfall 001 to the Clinton River via storm sewers. The permittee also is authorized to discharge an unspecified amount of stormwater runoff from outfalls 002, 010, and 011 to the Clinton River via storm drains. The final effluent of outfall 001 is limited for oil and grease (10 mg/l as daily maximum) and pH (6-9). The permittee also is required to monitor flow and to visually observe the effluent daily.

The permittee also conducted a short term waste characterization study at outfall 001 for total cadmium, hexavalent chromium, total copper, amenable cyanide, total lead, total silver, total zinc, methylene chloride, and total residual chloride and at outfall 011 for flow, total mercury, and total phosphorus once per week for six weeks.

GM-CPC-Pontiac Fiero Plant (MI0027804) 06/16/88 - 10/01/90 The facility is located at 900 Baldwin Avenue, Pontiac. The facility is authorized to discharge 0.03 MGD of fire protection test line water, air conditioner cooling water, overflow from steam condensate receiver stations, and drinking fountain overflow and stormwater runoff from outfall 001 to Harris Lake via storm sewers. The facility is also authorized to discharge stormwater runoff to Osmum Lake via storm sewers. The effluent of outfall 001 is required to monitor flow and outfall observation. The effluent of outfall 002 is limited for total copper (140 ug/l), total lead (75 ug/l), total zinc (1000 ug/l). The effluent of outfall 002 is also required to monitor tetrachloroethene (quarterly), flow, and outfall observation.

The facility has been idle since August, 1988. The stormwater runoff at outfall 002 includes runoff from zinc galvanized roof elevation structures (air intake houses, heater houses, drying ovens, etc.) and copper gutters. The Company had several instances of noncompliance with their permit limits at outfall 002 for zinc, copper, and lead. The Company has corrected the noncompliance by coating the zinc galvanized roof structures and copper gutters, installing filter devices at the downspouts, periodic roof cleaning and discharging initial washout to the sanitary sewer. The Company has been in compliance with the permit limits since September 1993. The Company requested their NPDES permit termination in May, 1993. This request is under review by MDEQ.

GM-Truck & Bus-Pontiac Central (MI0001007) 05/23/91-10/01/95 The facility is located at 660 South Boulevard East, Pontiac. The facility is authorized to discharge 1.3 MGD of noncontact cooling water and storm water runoff from outfall 001 to Murphy Creek via storm sewers. The permittee is required to monitor flow, temperature, pH, and outfall observation.

In September 1990, the manufacturing plant at the site was shut down and subsequently was sold. As of September 1990, all noncontact cooling water to outfall 001 was ceased and remaining discharge consists only of storm water, groundwater infiltration, and foundation drainage water. The Company is currently in the process of acquiring a general storm water permit from MDEQ.

The Company reported two spills since 1991. On September 18, 1991, the Company had approximately 300 lbs of non-hazardous fly ash spill to Murphy Creek. On April 8, 1992, the Company had approximately 3 gallons of hydraulic oil spill into Murphy Creek.

Grand Trunk WRR-Pontiac (MI0044202) 11/22/85 - 10/31/90 The facility is located at Orion Township Marshalling Yard, 1680 Silver Bell Road, Pontiac. The permittee is authorized to discharge 0.077 MGD of stormwater runoff and oil and water separator treated effluent to Judah Lake via wetlands. The effluent is limited for oil and grease (10 mg/l). The permittee is also required to monitor flow and visually observe the outfall. No recent permit violations or spills have been reported.

Hop-In Food Stores Inc (MI0048844) 07/19/90 - 10/01/94 The facility is located at 7000 Cooley Lake Road, Union Lake. The facility is authorized to discharge 0.072 MGD of treated groundwater from outfall 001 to Mercedes Lake. The effluent is monitored and limited for flow, BETX, benzene, and outfall observation. The gasoline contaminated groundwater is treated with a two-stage activated carbon treatment system.

Mobil Oil Corp-Drayton Plains (MI0050938) 03/19/92 - 10/01/96 The facility is a Mobil gasoline station located at 4290 Walton Road in Drayton Plains. It is a LUST remediation site with treatment system and permit limitations and monitoring requirements similar to those discussed above. Discharge is to the Clinton River via storm sewers.

The facility has had a few exceedences of the permit limits for Benzene and BTEX (March and May 1993).

Mobil Oil Corp-Pontiac (MI0050709) 01/16/92 - 10/01/96 The facility is a Mobil gasoline station located at 749 Featherstone in Pontiac. It is a LUST remediation site with treatment system and permit limitations and monitoring requirements similar to those discussed above. Discharge is to the Clinton River via storm sewers.

Molmec Inc-Metalplast Div. (MI0039446) 03/28/91 - 10/01/95 The facility is located at 321 South Street, Rochester. The facility is authorized to discharge 0.025 MGD of recirculating noncontact cooling water system blowdown from outfall 001 and unspecified amount of storm water runoff from outfall 002 to the Clinton River. The permittee is required to retain self-monitoring records for flow, temperature, and outfall observation.

Oakland CDC-SOCSDS CSO (MI0026115) 04/30/74 - 12/31/78 The Southeastern Oakland County Sewage Disposal System (SOCSDS) provides sewer service to all of the areas within the Cities of Berkley, Clawson, Ferndale, Hazel Park, Huntington Woods, Madison Heights, Oak Park, Pleasant Ridge, Royal Oak, and the Township of Royal Oak. Part of the area within the Cities of Birmingham, Southfield, Troy, and the Village of Beverly Hills also receives sewer service from the SOCSDS.

The SOCSDS has the storage capacity of 280 acre/feet (approximately 95 million gallons) of combined sewage. After a storm event, flows of combined sewage retained in the storage basin are pumped into the Dequindre Interceptor up to a capacity of 260 cubic feet per second. Only when the storage capacity of the retention basin is exceeded, will a CSO spill occur to the Red Run Drain. The discharge to the Red Run Drain is chlorinated.

PDQ Air Service Inc (MI0048054) 11/16/89 - 10/01/93 The facility is located at Oakland-Pontiac Airport, 6544 Highland Road, Pontiac. The facility is authorized to discharge 0.144 MGD of treated groundwater through outfall 001 to Wilmont Drain via storm sewers. The contaminated groundwater is treated by air stripping. The final effluent is limited for BTX (20 ug/l as daily maximum). The permittee is also required to monitor flow and outfall observation.

Pontiac WWTP (MI0023825) 08/22/91 - 10/01/95 The City of Pontiac Wastewater Treatment system consists of two wastewater treatment facilities, the East Boulevard plant and the Auburn Road plant. Treatment processes of the East Boulevard plant include: bar screen, two grit tanks, two primary settling tanks, four aeration tanks, and four final settling tanks. All the wastewater treated at the East Boulevard plant is pumped to the Auburn plant for additional treatment and discharge. The East Boulevard plant is equipped to bypass partially treated, chlorinated effluent if the system becomes hydraulically overloaded.

The Auburn plant consists of two grit chambers, screens, four primary settling tanks, four aeration tanks, four final settling tanks, four mixed media filters, and chlorination and dechlorination systems. Approximately, 15-16 MGD of treated wastewater is discharged through outfall 001 to the Clinton River. The Auburn plant is equipped with a bypass located after the screens.

The Plant has been in compliance with their NPDES permit limits since January 1992 except mercury (Dec. 92, Jan. 93, Feb. 93), fecal coliform (Apr. 92), and D.O. (Aug. 93). The Plant, recently, received a Notice of Violation from the Department due to an illegal discharge of activated sludge to the Clinton River. This violation was noticed during MDNR's (now MDEQ) inspection and immediately corrected upon the discovery. This violation was due to operator error.

Plute Construction (MI0048216) 10/20/89 - 10/01/94 The facility is located at 2695 Crooks Road, Rochester Hills. The facility is authorized to discharge 0.022 MGD of treated groundwater to the Clinton River via storm drains and sewers. Gasoline contaminated groundwater is treated with a two-stage activated carbon treatment system. The final effluent is limited for BTX (20 ug/l). The permittee is also required to monitor flow and visual outfall observation. No recent permit violations have been reported.

Rochester WWTP (MI0023931) 09/22/89 - 01/01/95 In July, 1994, the City completed connection of the sanitary sewers to the City of Detroit WWTP and terminated their discharge to the Clinton River.

Appendix C. Part 201, Part 115 and unlicensed landfills located along the Clinton River and its tributaries, status as of August 1994.

NOTE: Part 201 of the Natural Resources Environmental Protection Act (NREPA) of 1994, as amended was formerly PA 307 of the Michigan Environmental Response Act (MERA). Part 115 of NREPA of 1994, as amended was formerly the Solid Waste Management Act of 1978, PA 641, as amended.

Oakland County

Pontiac City Landfill: Most likely a municipal landfill which operated during the 1950's. The landfill is located adjacent to the Clinton River, near Crystal Lake in the city of Pontiac. The site may have been a gravel pit prior to landfilling activities. No information was available regarding this site in the MDEQ files.

Crystal Lake Landfill: This site is located east of the Pontiac City landfill, adjacent to Crystal Lake and the Clinton River. The site probably operated as a municipal/industrial landfill, although there was no information available in MDEQ files.

Featherstone Landfill: No information was available on this site, which is located north of and adjacent to the Clinton River in the City of Pontiac.

Spring Lake Landfill: No information was available in the MDEQ files regarding the environmental conditions at this site. The landfill, which is located south of and contiguous to the Clinton River in the City of Pontiac, probably operated during the 1950s.

Collier Road Landfill/I.S.A. Landfill: Both of these sites are listed as MERA Act 307 sites of environmental contamination in Oakland County. The sites are currently under remedial investigation by the MDEQ. Both sites are located adjacent to the Galloway Creek which drains into the Clinton River.

Christianson-Adams Landfill/Veterans-Cardinal Landfill:

The landfills, which are listed as Act 307 sites of environmental contamination, are located in Rochester Hills. The landfills operated in the 1950's and 1960's and accepted liquid industrial and hazardous waste. The sites are presently being investigated through MDEQ/USEPA contractors. The landfills are contiguous to a drain that empties into the Clinton River in Oakland County.

Macomb County

Mt. Clemens Landfill/N. River Road Landfill: The landfill is located north of and contiguous to the Clinton River in the City of Mt. Clemens. The area is partially occupied by North MacArthur Park at the present time. There was no information available in the MDEQ files regarding environmental conditions at the site.

Selfridge Air Force Base (SAFB): Several landfills are located on SAFB property, although their exact locations were not available. SAFB is a MERA Act 307 site of environmental contamination, with remedial investigations currently ongoing throughout the site.

177 South Rose Landfill: No information was available regarding this site, which is contiguous to the north edge of the Clinton River in Mt. Clemens.

Dean's River Road Landfill: A municipal and industrial waste landfill which operated in the 1960's. Documentation in the files indicates that hazardous waste (paint sludge) was also dumped in the landfill during the 1960's. The site is contiguous to the Clinton River with waste placed at the water table during operation of the landfill. A storm sewer installed through the waste is a potential migration pathway for leachate into the Clinton. The site is listed on the MERA Act 307 list, although there has been little investigation or remedial action initiated.

Freedom Hill/SMDA # 6 Landfill: A municipal landfill which was operated by the South Macomb Disposal Authority (SMDA) in the 1960's. The site, which is contiguous to the Red Run Drain, is an Act 307 site with voluminous information in the MDEQ files. The Red Run MERA 307 listing includes the following landfills: Freedom Hill/SMDA # 6, Fostoria/SMDA # 4, Baumgartner Park/SMDA # 2, Detroit Fill LF, Maple Lane LF.

Inspections conducted at the site in the 1980's indicated severe leachate outbreaks impacting the Red Run. Recent inspections of the site by MDNR (now MDEQ) staff revealed leachate outbreaks discharging directly into the Red Run. Sediment and water samples were collected at the facility, with the results pending.

Fostoria/SMDA # 4 Landfill: Another municipal landfill operated by SMDA in the 1960's. The site is located contiguous to the Red Run Drain, across from the Freedom Hill site. The landfill is a MERA Act 307 site of environmental contamination and is included in the same file as Freedom Hill. An inspection of the site is planned to investigate the possible discharge of leachate to the Red Run Drain. Previous inspections by ERD indicated several leachate outbreaks into the drain. Inspections conducted in the mid-1980's indicated severe leachate outbreaks throughout the site.

Baumgartner Park/SMDA # 2 Landfill: A municipal landfill operated by SMDA in the 1960's. The site is included on the Act 307 list. Little information was available regarding this site in MDEQ files. A site inspection to investigate the possible discharge of leachate to the adjacent Red Run Drain is proposed.

Detroit Fill Landfill (Red Run): Part of the Act 307 Red Run listing. The site is contiguous to the Red Run, directly across from the Maple Lane Landfill. No recent inspections of the site have been conducted, but it's believed that conditions are similar to those at the aforementioned Red Run sites. Potential impacts to the Red Run would be primarily from leachate outbreaks and/or groundwater contamination.

Maple Lane Landfill: Part of the Act 307 Red Run listing for environmental contamination. The site is contiguous to the Red Run, directly across from the Detroit Fills landfill cited above. No recent inspections of the site have been conducted, but it's believed that conditions are similar to those at the aforementioned Red Run sites. Potential impacts to the Red Run would be primarily from leachate outbreaks and/or groundwater contamination at the site.

SMDA # 5 Landfill/(Weir Property): Most likely a municipal landfill operated by SMDA in the 1960's. The Sterling Heights site is located adjacent to the Newth Drain which flows into the Clinton River. Potential impacts to the Clinton would be primarily from leachate outbreaks and/or groundwater contamination at the site.

Blundt Landfill: A landfill that is contiguous to the Red Run Drain in Warren. No information was available in the MDEQ files. Potential impacts to the Red Run/Clinton would be from leachate outbreaks and/or groundwater contamination at the site.

Detroit Fill Landfill-Warren: A large landfill that is contiguous to the Red Run in the City of Warren, and also to the Big Beaver Creek which drains into the Red Run. The waste material was from the City of Detroit and was probably landfilled during the 1950's.

Detroit Fill-Big Beaver Creek: The site consists of at least three (3) areas of waste disposal contiguous to the Big Beaver Creek in Sterling Heights. The waste material probably consisted of incinerator ash from the combustion of municipal waste generated in the City of Detroit. Placement of the waste most likely occurred in the 1940's and 1950's.

An inspection of a portion of the landfill was conducted by MDNR (now MDEQ) in 1994. The outfall from a drain at the site was sampled, and sediment from Big Beaver Creek was also collected for analysis. The analytical results were pending during the writing of this summary. During the inspection it was apparent that the fill at the site consisted of incinerator ash, with glass and metal fragments evident throughout the waste. Presently, the USEPA regards municipal incinerator ash as a hazardous waste due to certain heavy metal constituents (e.g. lead, cadmium). Potential impacts to the Red Run/Clinton would be from leachate outbreaks and/or groundwater contamination at the site.

SMDA # 3 Landfill/Koch Road Landfill: A municipal landfill located in the same area as the aforementioned Detroit Fill sites. The sites are contiguous to Big Beaver Creek and may have accepted waste in the 1940s. Industrial and hazardous wastes were allegedly dumped at the site. The landfill is included on the MERA Act 307 list of environmental contamination sites.

Hamlin Road Landfill: A MERA Act 307 site of environmental contamination, the Hamlin Rd landfill was a municipal waste disposal site operational in the 1970s - 1980s. The landfill, which borders the Clinton River, has an underdrain system which discharges to the Clinton. The underdrain is a potential pathway for the migration of leachate and contaminated groundwater into the Clinton River. An inspection of the site conducted on 5/20/94 revealed serious leachate outbreaks that threaten the Clinton River. Samples from the leachate outbreaks and the underdrain system were collected for analysis. The analytical results are pending at this time.

St. Lawrence Cemetery Landfill: A former gravel pit area that was subsequently filled with waste. The site is contiguous to the Clinton River in the City of Utica. There are several other landfills located in the vicinity of this site and in close proximity to the Clinton River. The waste type and operational history at this site is probably similar to the following four landfills. No inspections have been conducted at these sites. No information regarding potential leachate outbreaks or groundwater contamination was available in the MDEQ files.

Utica City Landfill: Probably a municipal waste landfill that was operational in the 1960s. The Utica City landfill is contiguous to the Clinton River and the Ramona Park LFs. No information on potential leachate outbreaks or groundwater contamination were available in the MDEQ files.

Ramona Park 1 & 2 Landfill: A MERA Act 307 site of environmental contamination that is located adjacent to the Clinton River in the City of Utica. The site was operational in the 1960s and accepted industrial waste until 1970. Little information regarding environmental conditions at the site was available in MDEQ files. USEPA sampled soils in the floodplain in 1992, although the results were not in MDEQ files. An underdrain at the site discharges to the Clinton River.

Cardinal Landfill: Located adjacent to the Clinton River in Utica. It operated as municipal waste landfill in the 1960s and 1970s and was capped in 1976. No information concerning potential leachate outbreaks or groundwater contamination was available in the MDEQ files.

Detroit Fill Landfill (Utica): Located adjacent to the Clinton River in the City of Utica. The waste deposited at the site may have included incinerator ash from the City of Detroit. No information concerning potential leachate outbreaks or groundwater contamination was available in the MDEQ files. Potential impacts to the Clinton River from leachate outbreaks and/or groundwater contamination at the site.

Appendix D. Contacts for Additional Information

- Clinton River Public Advisory Council
- Statewide Public Advisory Council

Bill Smith
(810)468-4028

- RAP Coordination
- Contaminated Sediments

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Surface Water Quality Division
(517)335-3265

- NPDES regulated discharges

Hae-Jin Yoon
Michigan Department of Environmental Quality
Surface Water Quality Division
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- County Health Department sampling
- Improperly functioning septic systems

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Macomb County Health Department
(810)469-5236

Robert Long
Oakland County Health Division
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- Combined Sewer Overflows

Margie Synk
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- 319 Nonpoint Source Grants and Projects
- NPS Best Management Practices

Martin Hendges
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(313)953-1470

- Fisheries Programs

Jennifer Beam
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Curt Kluft
Clinton Valley Chapter of Trout Unlimited
(810)286-1328

- Wildlife Programs

Julie Parsons
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- Wetland Programs and Permits
- Aquatic Herbicide Application Permits

Mike Nurse
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- MDEQ Waste Management Division
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- Air Quality

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● Superfund Sites

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Bill Lasher
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● Agricultural Stormwater Management

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- Local Stormwater Management
- Local Land Use Planning

Peggy Johnson
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● Oakland University Database

Robbin Hough
Oakland University
(810)370-4089

- Education Programs on Watershed Management
- Volunteer Monitoring Program
- Adopt-a-Stream Program
- Clinton River Early Warning System

Erich Ditschman
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● Spillway Weir Modifications

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U.S. Army Corps of Engineers
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● Erosion Control

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● Municipal WWTP Industrial
Pretreatment Program

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